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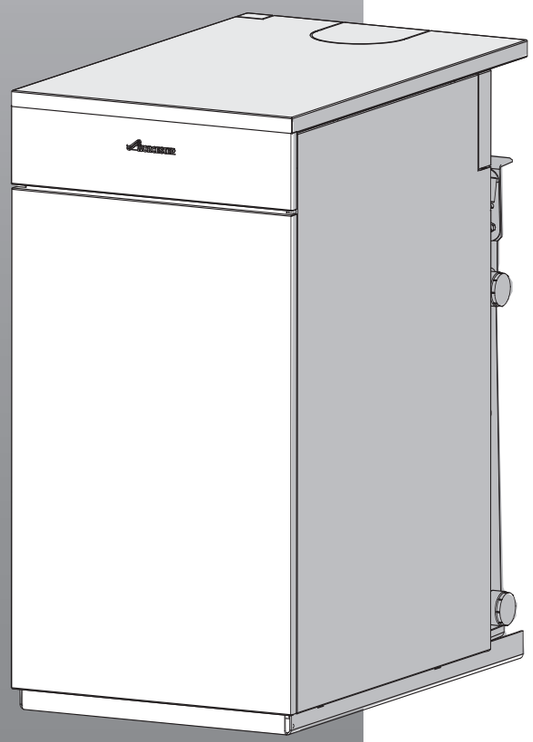
INSTRUCTION MANUAL

INSTALLATION, COMMISSIONING & SERVICING

FLOOR STANDING OIL-FIRED CONDENSING BOILER CONVENTIONAL FLUE & ROOM SEALED FLUE

GREENSTAR UTILITY 32/50 & 50/70

FOR FULLY PUMPED OPEN VENT OR SEALED CENTRAL HEATING SYSTEMS AND DOMESTIC HOT WATER CYLINDERS



THE APPLIANCE IS FOR USE WITH KEROSENE (28 SECOND OIL) ONLY

UK

WORCESTER

Bosch Group

SYMBOLS USED IN THIS MANUAL:

Domestic hot water

Central heating

Room thermostat

Wait time period

Programmer/timer OFF

Programmer ON CH only

Programmer ON DHW only

Programmer ON CH and DHW

Electricity supply

IMPORTANT HANDLING INSTRUCTIONS:
It is advised that more than one person is involved in the transfer of the packaged appliance from the van to the point of installation.
It is advised that no attempt should be made to move the packaged appliance without the use of a suitable truck.
At all times the correct method for handling heavy objects should be strictly observed.

GENERAL HANDLING GUIDELINES:

- Lift only a manageable weight, or ask for help.
- When lifting, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry items close to the body.
- Wear protective clothing and gloves to protect from any sharp edges.

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

THESE INSTRUCTIONS ARE APPLICABLE TO THE WORCESTER APPLIANCE MODEL(S) STATED ON THE FRONT COVER OF THIS MANUAL ONLY AND MUST NOT BE USED WITH ANY OTHER MAKE OR MODEL OF APPLIANCE.

THE INSTRUCTIONS APPLY IN THE UK AND EIRE ONLY AND MUST BE FOLLOWED EXCEPT FOR ANY STATUTORY OBLIGATION.

THIS APPLIANCE MUST BE INSTALLED BY A COMPETENT PERSON. FAILURE TO INSTALL CORRECTLY COULD LEAD TO PROSECUTION.

COMPLYING WITH THE BUILDING REGULATIONS:
This heating appliance forms part of the controlled services for the building. It is law that all controlled services for buildings must comply with building regulations. You must be able to satisfy your Local Authority Building Control Body (LABC) that the work carried out concerning the installation and commissioning of this heating appliance has been carried out to a satisfactory standard.

OFTEC operate a competent persons scheme and registered installers are able to certify that their work complies with building regulations. Under the scheme;

- OFTEC must be informed about every installation.
- OFTEC will issue a building regulations compliance certificate to the householder and will notify the LABC.

OFTEC provide controlled document forms CD10 and CD11 for use during installation and commissioning respectively.

Other organisations operate self-certification schemes e.g. NAPIT and BESCA Ltd. and it may be possible for installers who are members of these organisations to self certify their work.

Alternatively you must submit a building control notice to the LABC before installing any boiler. The LABC will then arrange regular inspection visits during the work to ensure that the installation complies with the regulations.

IF YOU ARE IN **ANY DOUBT** CONTACT THE WORCESTER TECHNICAL HELPLINE.

DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER.

PLEASE LEAVE THESE INSTRUCTIONS WITH THE COMPLETED COMMISSIONING FORM AND THE USER MANUAL WITH THE OWNER OR WITH THE APPLIANCE AFTER INSTALLATION OR SERVICING. THE SERVICE INTERVAL RECORD CAN BE FOUND ON THE BACK PAGE OF THIS MANUAL.

ABBREVIATIONS USED IN THIS MANUAL:

Ø	Diameter
CH	Central Heating
DHW	Domestic Hot Water
DCW	Domestic Cold Water
TRV	Thermostatic Radiator Valve
IP	Ingress Protection
CF	Conventional flue
BF	Balanced flue
N/A	Not allowed
SEDBUK	Seasonal Efficiency of Domestic Boilers in the United Kingdom
OFTEC	Oil Firing Technical Association for the Petroleum Industry
IEE	Institute of Electrical Engineers
LABC	Local Authority Building Control Body

STORE THE APPLIANCE IN A DRY AREA PRIOR TO INSTALLATION.

WATER TREATMENT:

FERNOX	01799 550811 fernox.com
SENTINEL	0800 389 4670 sentinel-solutions.net

FLUE TERMINAL GUARD: Part No. 7 716 190 050

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SAFETY PRECAUTIONS

OIL FUMES OR LEAKS FROM THE APPLIANCE:

- ✔ Extinguish any naked flames.
- ✔ Open windows and doors.
- ✔ Isolate the electrical supply.
- ✔ Isolate the fuel supply to the boiler.
- ✔ Rectify fault.

HEALTH & SAFETY:

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988). Where applicable, the CE mark indicates compliance with relative EU Directives.

COMBUSTIBLE AND CORROSIVE MATERIALS:

Do not store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

The combustion air must be kept clear of chemically aggressive substances which can corrode the appliance and invalidate any warranty.

FITTING & MODIFICATIONS:

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with these instructions and the relevant Installation Regulations.

Flue systems must not be modified in any way other than as described in the fitting instructions. Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING:

Advise the user to have the system regularly serviced by a competent, qualified engineer (such as OFTEC registered personnel) using approved spares, to help maintain the economy, safety and reliability of the appliance.

IMPORTANT:

This boiler must only be operated by a responsible adult who has been instructed in, understands and is aware of the boiler's operating conditions and effects.

INSTALLATION REGULATIONS

Failure to install appliances correctly could lead to prosecution.

The appliance should be installed by a competent person. The person installing the appliance should be aware of the Health and Safety at Work Act and take appropriate action to ensure that the regulations are adhered to. In order to give optimum efficiency and trouble free operation the appliance must be commissioned by a qualified OFTEC engineer.

The compliance with a British Standard does not, in itself, confer immunity from legal obligations. In particular the installation of this appliance must be in accordance with the relevant requirements of the following British Standards and regulations in respect of the safe installation of equipment:

BS 5410: part 1: Code of practice for Oil Fired Boilers.

BS 799: part 5: Specification for Oil Storage Tanks.

BS 7593: Code of Practice for treatment of water in domestic hot water central heating systems.

BS 5449: part 1: Specification for forced circulation hot water central heating for domestic premises.

BS 5955: part 8: Specification for the installation of thermoplastic pipes and associated fittings for use in domestic hot and cold water services and heating systems.

BS 7291: Thermoplastic pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings.

BS 7074: part 1: Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

BS 7671: IEE Wiring Regulations, current edition.

BS 1362: Specification for general purpose fuse links for domestic and similar purposes.

The Building Regulations Part G, Part J and L1 England and Wales; Part F, Part G and Part J Section III Scotland; Part L and Part F Northern Ireland.

Local water company bye-laws.

The Control of Pollution (Oil) Regulations.

OFTEC Standards.

Where no specific instruction is given, reference should be made to the relevant codes of practice.

Installations in Eire (Republic of Ireland)

The Installation must be performed by a competent and suitably trained person in accordance with the following Eire regulations.

Current Building Regulations - Republic of Ireland

ETCI rules for electrical installation

For further guidance see:

OFTEC Technical book three - Regional requirements: Republic of Ireland

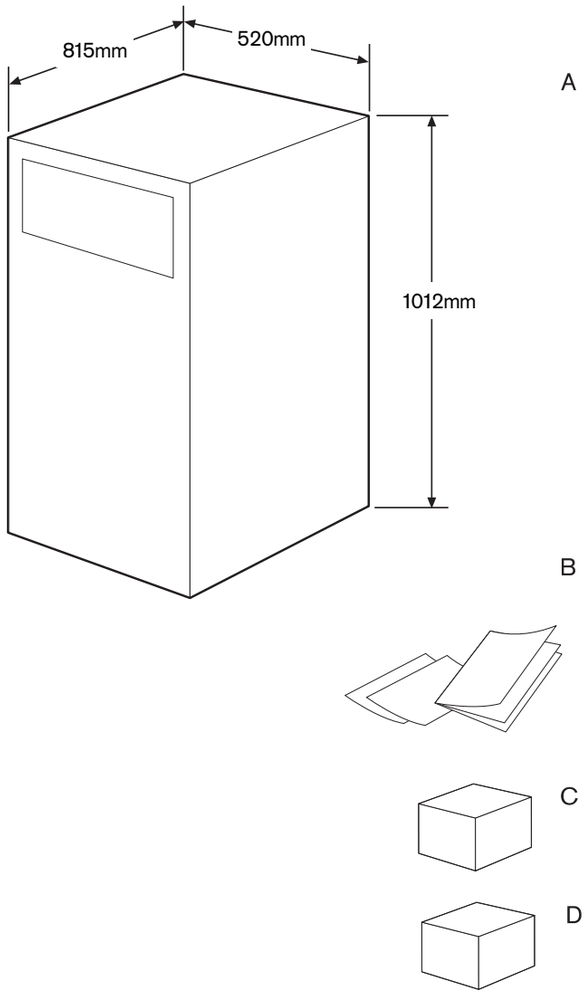
STANDARD PACKAGE:

A - Floor standing oil fired condensing boiler for open vent and sealed domestic central heating and mains fed hot water.

B - Literature pack.

C - Hardware pack.

D - Return pipe kit.

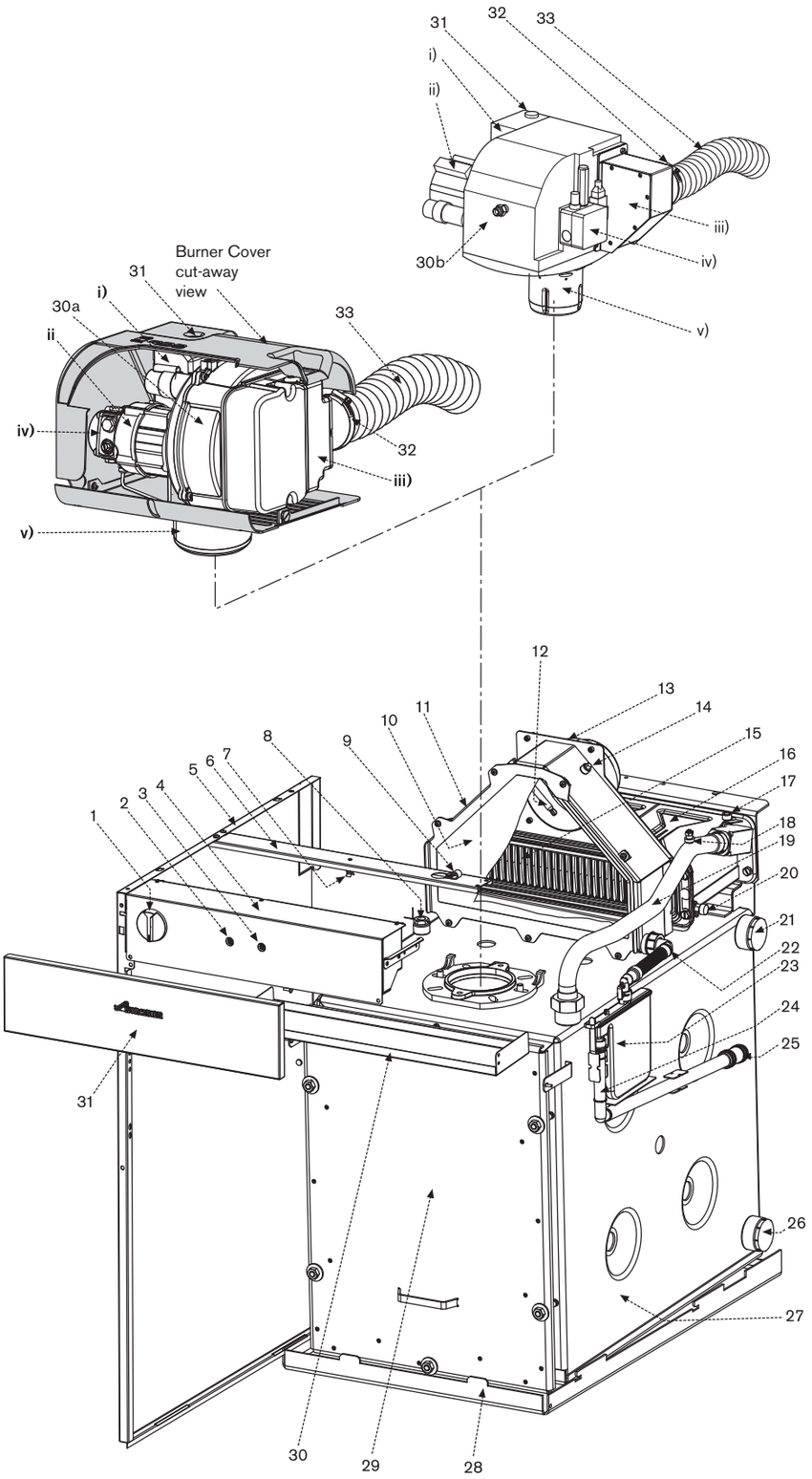


Check List

Hardware/Literature pack

Item	Qty
Greenstar Utility Installation/Servicing Instructions	1
Users Instructions	1
Top Panel Inset Plate	1
Edge Clips	1
Warranty Return Envelope	1
Return Pipe Kit	1

DESCRIPTION	UNITS	32/50	50/70
Central Heating			
Primary water capacity (total)	litres	50	51
Maximum static head	metres	30	30
Minimum static head	metres	1	1
Water side resistance (20°C difference)	mbar	26	40
Water side resistance (10°C difference)	mbar	52	104
Flue			
Exit flue gas mass flow	kg/hr	76	106
Conventional flue (minimum diameter required)	mm	130	130
Room sealed flue (diameter)	mm	100/150	100/150
Pipework connections			
Fuel line (compression)	mm	10	10
CH flow	inch BSP	$1^1/_2$	$1^1/_2$
CH return	mm	28	28
CH vent	inch BSP	$1^1/_2$	$1^1/_2$
CH make up	inch BSP	$1^1/_2$	$1^1/_2$
Condensate (polypropylene)	mm	21.5	21.5
Electrical			
Electrical power supply voltage	AC...V	230	230
Frequency	Hz	50	50
Max. power consumption	W	190	220
Thermostats			
Boiler flow temperature range (cut out)	°C	60/82	60/82
CH control thermostat differential	°C	5	5
Boiler high limit thermostat set point (+ 0.6°C)	°C	100	100
Boiler manual reset overheat thermostat (cut out)	°C	110	110
Flue manual reset overheat thermostat (+ 0.6°C)	°C	120	120
General Data			
Maximum hearth temperature	°C	100	100
SEDBUK (Band A) 20	%	93.0	92.5
Appliance protection rating	IP	20	20
Weight (excluding packaging)	kg	270	280



LAYOUT & COMPONENTS

The diagram opposite excludes the top, front and RH side casing panels.

1 CH THERMOSTAT CONTROL
2 RESET BUTTON BOILER OVERHEAT
3 RESET BUTTON FLUE OVERHEAT
4 CONTROL BOX ASSEMBLY
5 CASING SIDE PANEL
6 CASING SUPPORT PANEL
7 CLIP - FIRE SENSOR
8 CONTROL, AUTOMATIC HIGH LIMIT & MANUAL HIGH LIMIT THERMOSTATS
9 CLIP - POWER CABLE
10 FLUE MANIFOLD ACCESS COVER
11 CH RETURN PIPE
12 MANUAL RESET FLUE OVERHEAT THERMOSTAT
13 FLUE MANIFOLD
14 FLUE GAS SAMPLING POINT
15 - 16 SECONDARY HEAT EXCHANGER
17 MANUAL AIR VENT - SECONDARY HEAT EXCHANGER
18 MANUAL AIR VENT - SECONDARY TO PRIMARY HEAT EXCHANGER RETURN PIPE
19 SECONDARY TO PRIMARY HEAT EXCHANGER RETURN PIPE
20 DRAIN-SECONDARY HEAT EXCHANGER
21 CH FLOW CONNECTION LEFT & RIGHT HAND SIDE
22 CONDENSATE OUTLET
23 INTERNAL CONDENSATE TRAP
24 CONDENSATE DRAIN
25 CONDENSTAE DRAIN PUSH-FIT CONNECTOR
26 OPTIONAL COLD FEED/DRAIN LEFT & RIGH HAND SIDE
27 PRIMARY HEAT EXCHANGER
28 BASE PLATE
29 COMBUSTION CHAMBER ACCESS DOOR
30 OIL DRIP TRAY
31 TOP FRONT PANEL

30a RIELLO RDB 3.2 (32/50)
RIELLO RDB 4.2 (50/70)
- i) Control box
- ii) Motor
- iii) Air intake casing
- iv) Oil pump
- v) Combustion head

30b BENTONE STERLING 133 (32/50)
BENTONE STERLING 146 (50/70)
- i) Control box
- ii) Motor
- iii) Air intake casing
- iv) Oil pump
- v) Combustion head

31 LOCKOUT INDICATOR/RESET BUTTON
32 CLIP - AIR INTAKE HOSE
33 AIR INTAKE HOSE

IMPORTANT: All the following Pre-Installation sections must be read and requirements met before starting boiler or flue installation.

CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

CLEANING PRIMARY SYSTEMS

IMPORTANT: Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance warranty.

BEFORE CLEANING THE SYSTEM:

ENSURE THE SYSTEM AND PIPEWORK IS IN GOOD WORKING ORDER.

FLUSH THE EXISTING SYSTEM WITH A POWER FLUSHING MACHINE OR WITH A CHEMICAL CLEANER BEFORE INSTALLING NEW COMPONENTS.

CLEANING THE PRIMARY SYSTEM:

- Cleanse the system in accordance with BS 7593.
- Fill the system with cold mains water to the recommended pressure and check for leaks.
- Open all drain cocks and drain the system.
- Close drain cocks and add a suitable flushing agent at the correct strength for the system condition in accordance with the manufacturer's instructions.
- Circulate the flushing agent before the boiler is fired up.
- Run the boiler and system at normal operating temperature in accordance with the manufacturer's instructions.
- Drain and thoroughly flush the system to remove the flushing agent and any debris.

MAINS SUPPLY

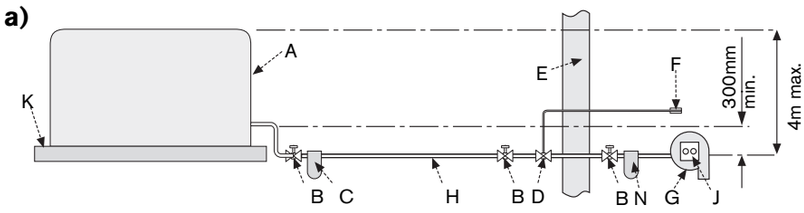
ELECTRIC SUPPLY:

- Supply: 230V - 50Hz.
- Cable: PVC insulated 0.75mm^2 (24 x 0.2mm) temperature rated to 90°C.
- Protection IP20.
- External 5A fuse to BS1362.
- The appliance must be earthed.
- Refer to IEE regulations for cross bonding requirements.
- It must be possible to isolate the appliance from the electrical supply with at least a 3mm contact separation in both poles supplying the appliance.
- Wiring between the appliance and the electrical supply must comply with IEE wiring regulations and any local regulations which may apply for fixed wiring to a stationary appliance.
- Any system connected to the boiler must not have a separate electrical supply.

A - Oil storage tank.
B - Isolating valve.
C - Oil strainer & water separator.
D - Fire valve to BS 5410.
E - External wall.
F - Fire valve sensor.
G - Oil burner.
H - Oil supply pipe.
J - Oil pump.
K - Full base (plastic tanks).
L - Non-return valve.
M - De-aerator.
N - Oil filter (16μm max filtration size)

NOTE: All dimensions are in metres unless stated otherwise.
The maximum pipe run figures are based on using copper pipe with an inside diameter of 2mm less than the Ø.

a)

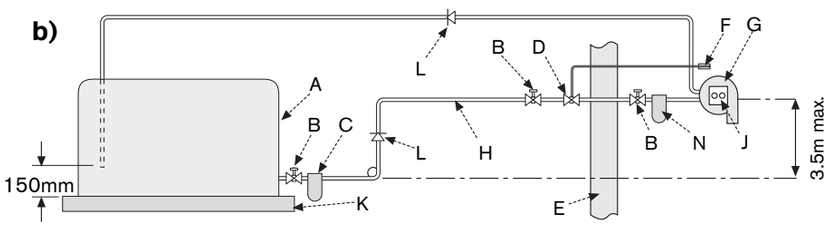


MAXIMUM PIPE RUN FOR SINGLE PIPE GRAVITY FEED SYSTEM

HEAD	10mmØ	12mmØ
0.5	12	30
1.0	25	69
1.5	37	91
2.0	49	100

HEAD	10mmØ	12mmØ
2.5	62	100
3.0	74	100
3.5	87	100
4.0	99	100

b)

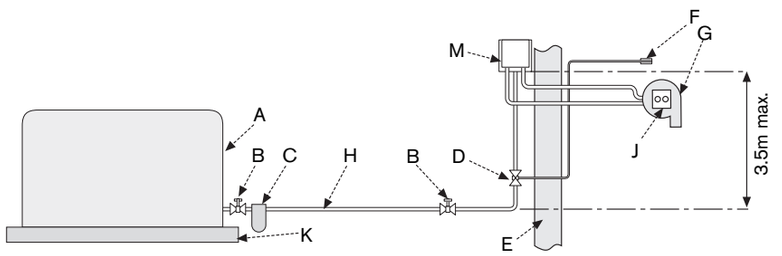


MAXIMUM PIPE RUN FOR DOUBLE PIPE SUB-GRAVITY FEED SYSTEM

HEAD	10mmØ	12mmØ
0	50	100
0.5	44	100
1.0	38	95
1.5	32	80

HEAD	10mmØ	12mmØ
2.0	26	66
2.5	20	50
3.0	14	37
3.5	8	22

c)



MAXIMUM PIPE RUN FOR SINGLE PIPE SUCTION LIFT WITH DE-AERATOR

HEAD	FUEL FLOW RATE 2.5kg/h 8mmØ	5kg/h 8mmØ	10kg/h 8mmØ	10kg/h 10mmØ
0	100	55	26	100
0.5	95	45	23	100
1.0	80	40	20	90
1.5	70	35	17	75

HEAD	FUEL FLOW RATE 2.5kg/h 8mmØ	5kg/h 8mmØ	10kg/h 8mmØ	10kg/h 10mmØ
2.0	60	30	14	65
2.5	45	25	11	50
3.0	35	15	8	35
3.5	25	10	5	20

The table and illustration above is a guide only and does not in any way override the de-aerator manufacturers instructions.

OIL SUPPLY

OIL SUPPLY :

- **This appliance is suitable for kerosene (28 second oil) only, no other fuel must be used.**
- Plastic or steel tanks should be installed to BS 5410. A steel tank should conform to BS 799: part 5 and have a slope of 1 in 24 away from the outlet valve with a sludge cock at its lower end.
- **Do not use galvanised steel tanks or pipework for the oil supply system.**
- **Do not use soldered joints on the oil supply pipework.**

a) Single pipe gravity feed system:
The oil storage tank (A) must be positioned so that the oil level does not exceed 4 metres above the level of the burner oil pump (J) and in addition the oil level must be at least 300mm above the oil pump (J). Where the maximum oil level in the oil storage tank exceeds 4 metres, a head breaking device must be installed between the tank (A) and the burner oil pump (J).

b) Double pipe sub-gravity feed system:
Maximum suction height 3.5 metres. Non-return valves must be fitted to the inlet and return oil line between the oil pump (J) and oil storage tank (A).

c) Single pipe suction lift with de-aerator
Maximum suction height 3.5 metres. The oil tank (A) must be positioned below the oil pump (J). Create an inlet and return loop between the de-aerator (M) and oil pump (J).

A non-return valve must be incorporated within the de-aerator or fitted to the oil line between the oil storage tank (A) and the de-aerator (M).

A top feed oil tank fitted with a de-aerator using an internal non-return valve should have any non-return valves fitted in the base of the tank to the suction line removed to assist purging air from the oil line.

Pipework

- Use copper pipe of the correct diameter according to the information shown opposite. Use flexible hoses to connect to the oil pump (J).
- Lay the oil supply pipe (H) as straight and level as possible to avoid air pockets and unnecessary friction losses. Route away from the boiler access door or other hot surfaces.
- Install a manual isolating valve (B) to the oil supply pipe (H), as close to the oil storage tank (A) as possible.
- Fit an oil strainer and water separator (C) to the oil supply pipe, near the oil storage tank. Fit an additional oil filter (N, 16μm max filtration size) close to the boiler, but not inside the boiler casing.
- Fit a fire valve in accordance with BS 5410. The fire valve (D) should be fitted externally to the building with the fire valve sensor (F) located within the appliance case.
  A fire valve with a shut off temperature of 85°C or higher must be fitted to avoid the possibility of nuisance shut offs.
  A capillary type valve provides a neat and simple installation. Alternatively, a fusible link or electrical system may be used.

Under no circumstances should a combination isolating/fire valve be used as the sole fire protection device.

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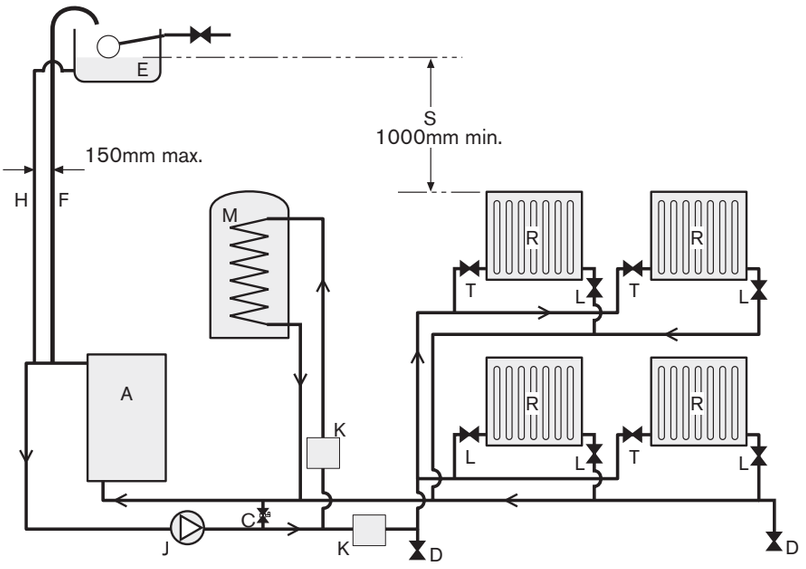
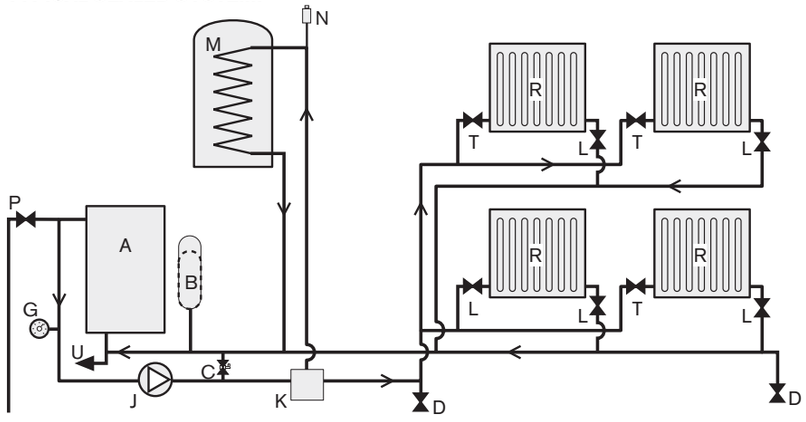
IMPORTANT: The boiler should not be allowed to operate with a return temperature of less than 40°C when the system is up to operating temperature.

TYPICAL OPEN VENT SYSTEM:



A - Appliance.
B - Expansion vessel.
C - Automatic bypass valve.
D - Drain cock.
E - Feed and expansion cistern.
F - Feed and expansion 15mmØ min.
G - Pressure gauge.
H - Open vent 22mmØ min.
J - Circulating pump.
K - Zone valve.
L - Lockshield valve.
M - Hot water cylinder.
N - Automatic air vent.
P - Pressure relief discharge.
R - Radiators.
S - Static head.
T - Thermostatic radiator valve (TRV).
U - To filling system.

TYPICAL SEALED SYSTEM:



PRIMARY SYSTEM PLASTIC PIPEWORK:

- Any plastic pipework used must have a polymeric barrier, comply with BS 7921and be installed to BS 5955 with 1000mm (minimum) length of copper or steel pipe connected to the boiler.
- Plastic pipework used for underfloor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approx. 50°C with 1000mm (minimum) length of copper or steel pipe connected to the boiler.

PRIMARY SYSTEM/CONNECTIONS/VALVES:

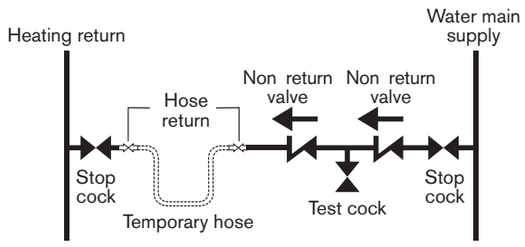
- **Do not use galvanised pipes or radiators**.
- All system connections, taps and mixing valves must be capable of sustaining a pressure of 3 bar.
- Radiator valves should conform to BS 2767:10.
- All other valves should conform to BS 1010.
- On new installations TRVs must be used on all radiators except the radiator where the room thermostat is sited, this must be fitted with lockshield valves and left open. All installations should have TRVs fitted to radiators within the sleeping accommodation.
- An automatic bypass valve must be connected between the heating flow and return where TRVs are used on all radiators, fitted to give at least a 3 metre circuit when activated.
- Drain cocks are required at all the lowest points on the system.
- Air vents are required at all high points on the system.

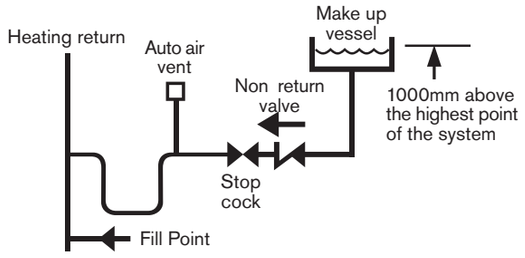
OPEN VENT PRIMARY SYSTEM:

- The open vent pipe (H) and feed and expansion pipe (F) must rise continuously from the appliance.
- The feed and expansion cistern (E) must be positioned to provide a static head (S) of at least 1 metre above the highest point in the heating system to the water level in the feed and expansion cistern (E).
- Ensure adequate space is left in the expansion cistern for expansion of the system water.
- No valve shall be fitted in the open vent pipe (H) or the feed and expansion pipe (F).
- The open vent pipe (H) must be at least 22mmØ.

FULLY PUMPED SEALED PRIMARY SYSTEM:

- A pressure relief valve (P), spring loaded safety valve set to operate at 3bar, must be fitted to the heating flow pipe as close as possible to the boiler or onto one of the boiler top $1^1/_2$" BSP outlets.
- An expansion vessel (B) must be fitted to the heating return pipe as close as possible to the boiler and pressurised for the system volume according to the instructions supplied with the vessel.
- A pressure gauge (G), 3 bar minimum, must be fitted to the heating flow pipe or one of the boiler $1^1/_2$" BSP outlets.
- An automatic air vent (N) must be fitted.



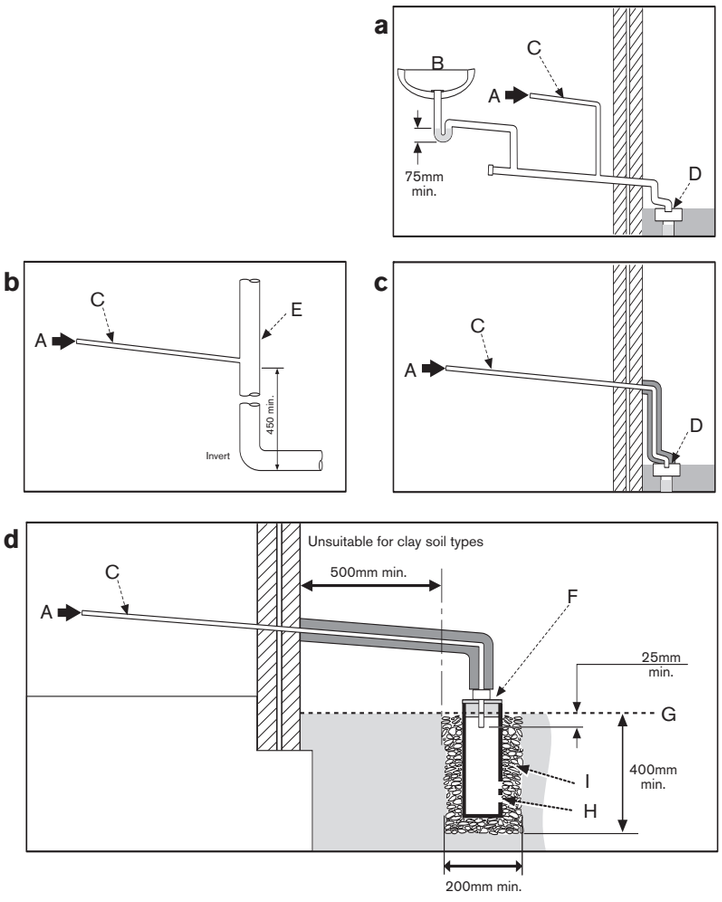


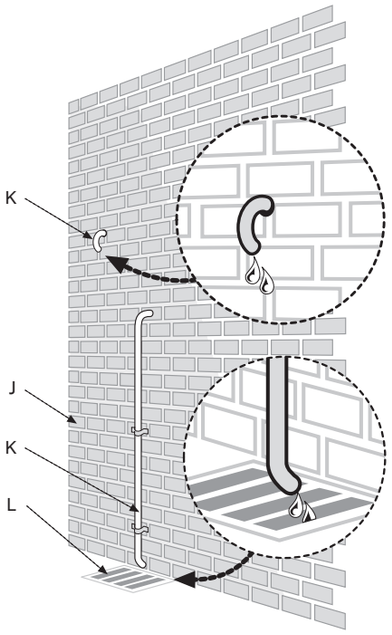
FILLING PRIMARY SEALED SYSTEMS:

- Filling the system must comply with one of the methods shown opposite.
- The filling point must be at low level and must never be a permanent direct fixing to the mains water supply.
- Filling links must be WRAS approved.

CONDENSATE &

PRESSURE RELIEF PIPEWORK





J - Outside wall.
K - Drain pipe.
L - External drain.

IMPORTANT: The pressure relief valve is a safety device for the boiler and if activated may discharge boiling water or steam through the relief valve drain pipe.
Care should be taken when siting the outlet pipe so that it does not cause an obstruction or discharge above a window, entrance or other public access where it could cause a hazard.

CONDENSATE PIPEWORK:

- All national and, where appropriate, local regulations for the discharge and neutralisation of condensate should be followed.
- The condensate pipe must be a minimum of 21.5mmØ polypropylene pipe.
- The condensate pipework must fall at least 50mm per metre towards the outlet and should take the shortest practicable route.
- Support the pipe at least every 0.5m for near horizontal runs .
- When a boiler is to be installed in an unheated location, such as a garage, all condensate pipes should be considered as external.

EXTERNAL PIPEWORK:

- The 21.5mmØ pipe mus not exceed 3 metres outside the building. If a run greater than 3m is required, 32mmØ pipe must be used.
- Any pipe exposed to windchill or extreme cold must be 32mmØ.
- Protect all external pipes with weather resistant insulation and box-in, if necessary to reduce the risk of freezing.
- Terminate as close to the ground as possible (below the grating and above the water level) while still allowing for safe dispersal of condensate. This will help reduce windchill freezing.

Connection of a condensate pipe to a drain may be subject to local building regulations.

MAKING IT SAFE:

- Condensate pipework must not leak, freeze or block up.
- Condensate traps must be filled before starting up the boiler to prevent potentially harmful flue products escaping via the condensate route.
- Do not dispose of condensate into water recovery systems.

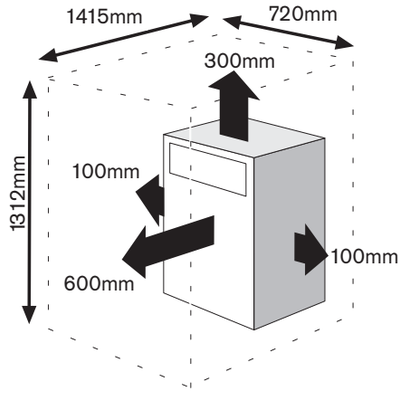
Condensate can be discharged into a rain water hopper which is part of a sewer system carrying both rain water and foul water.

- The pipework must follow one of the options shown opposite:
  a - Internal waste drainage system
  b - Soil/vent stack
  c - External drainage system
  d - External condensate absorbtion point
  A - Condensate from the boiler internal condensate trap which has a 75mm water seal.
  B - Sink.
  C - 21.5mmØ polypropylene condensate pipe.
  D - Gully.
  E - Internal soil and vent stack.
  F - 300mm 100mm Ø sealed plastic tube .
  G - Ground level.
  H - Drainage holes 50mm from base of tube (12mmØ at 25mm centres) facing away from building.
  I - Limestone chippings.

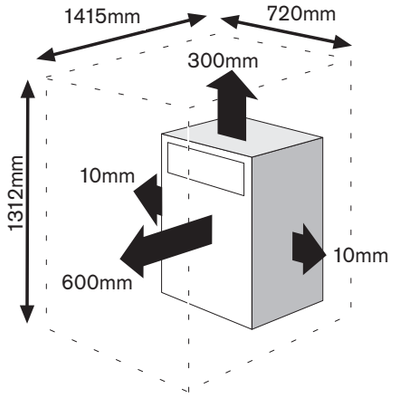
PRESSURE RELIEF PIPEWORK:

- The pressure relief drain pipe (K) should be at least 15mm diameter copper pipe and run downwards away from the boiler and discharge away from any electrics or other hazard, preferably to an external drain or soak away.
- Pipe (K) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing.

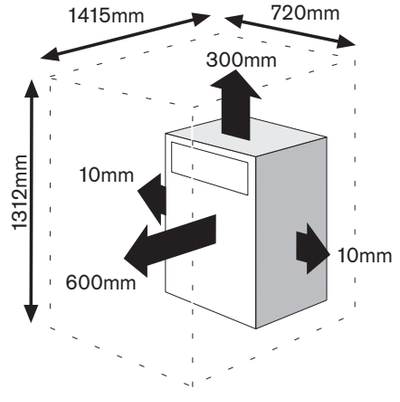
a: RECOMMENDED INSTALLATION CLEARANCES



b: ANNUAL SERVICE CLEARANCES



c: MAINTENANCE & REPAIR CLEARANCES



MINIMUM AIR VENT AREA (cm²) FOR APPLIANCES INSTALLED IN A COMPARTMENT:

[1]Internal air to and from a space/room inside the building. [2]External air to and from directly outside the building.

Conventional flue:*

Model	Internal [1] ventilation		External [2] ventilation	
	High Level	Low Level	High Level	Low Level
32/50	495	743	248	495
50/70	715	1073	358	715

Room Sealed flue:*

Model	Internal [1] ventilation		External [2] ventilation	
	High Level	Low Level	High Level	Low Level
32/50	495	495	248	248
50/70	715	715	358	358

BOILER LOCATION & CLEARANCES

- This boiler is only suitable for installing internally within a property at a suitable location onto a fixed rigid surface of the same size as the boiler and capable of supporting the boiler weight.
- The boiler must be installed on a flat level surface to ensure condensate does not enter the primary heat exchanger.
- The boiler is not suitable for external installation unless a suitable enclosure is provided.
- The boiler is not suitable for roof space installations.

Open flue model (CF):

- In order to ensure clean and efficient combustion an adequate supply of air must be delivered to the combustion chamber.
- To provide sufficient air a suitable inlet must be provided into the room or space in which the boiler is situated.

CF minimum air inlet sizes*

Output	32/50kW	50/70kW
Size cm²	248	358

An air brick or other form of continuous air supply may have to be built into the installation in order to ensure an adequate supply of air.

- If the appliance is to be installed in a confined space or compartment two air vents are required, one at high level and one at low level.

  The minimum free area of each vent is shown opposite and depends whether the air is taken from another room or from outside the building.
- Where the air is taken from another room that room must contain an air inlet as described above.

Room sealed balanced flue model (RS):

The appliance does not require a separate vent for combustion air.

- Installation in cupboards or compartments require permanent vents for cooling purposes, one at high level and one at low level, either direct to outside air or to a room.
- Both vents must pass to the same room or be on the same wall to the outside air.

The minimum air vent free area is given in the table opposite.

a: INSTALLATION CLEARANCES:
Diagram (a) shows the minimum space recommended to install the boiler only.

b: SERVICE CLEARANCES:
Diagram (b) shows the minimum space required to carry out an annual service.

c: MAINTENANCE & REPAIR CLEARANCES:
The appliance is suitable for an under worktop installation providing that the worktop above the boiler (min 10mm clearance) is removable for maintenance and repair and the front of the boiler is not enclosed.

** Due to changes to BS 5410 and modern building design, these figures no longer incorporate the adventitious ventilation allowance.*

BOILER LOCATION & CLEARANCES

COMPARTMENTS:

Follow the requirements of BS 5410 and note:

- Minimum clearances must be maintained.
- An access door is required to install, service and maintain the boiler and any ancillary equipment.
- If fitting the boiler into an airing cupboard use a non-combustible material (if perforated, maximum hole sizes of 13mm) to separate the boiler from the airing space.

Venting compartments:

There must be sufficient clearance around the appliance to allow proper circulation of ventilation air. The clearances required for installation and servicing will normally be adequate for ventilation.

- Ventilation must be provided for boilers fitted into compartments as described in BS 5410.
- Combustion air must not be taken from a room or internal space containing a bath or shower and must not communicate with a protected area such as a hall, stairway, landing, corridor, lobby, shaft etc.
- Air vents must allow access for clean free air and must be sited to comply with the flue terminal position requirements.
- Air ducting runs must not exceed 3m.
- Low level air vents must be less than 450mm from the floor.
- A warning label must be added to the vents with a statement to the effect: "Do not block this vent. Do not use for storage."

SHOWER / BATHROOMS:

The boiler **must not** be installed in zones 0, 1 or 2 (the shaded areas shown on the diagrams opposite).

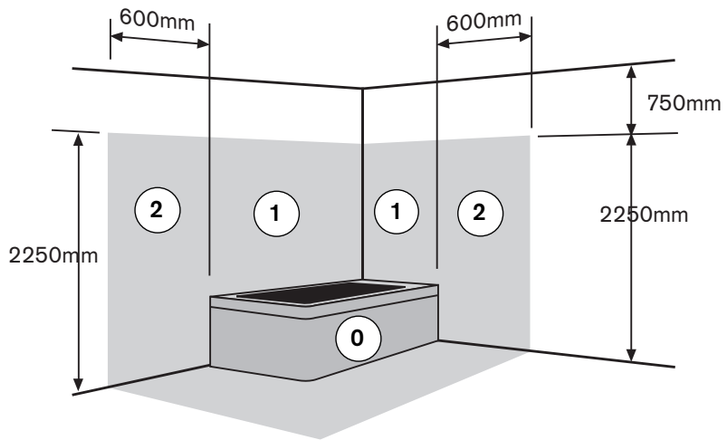
IMPORTANT: conventional flued boilers must not be fitted in a bathroom.

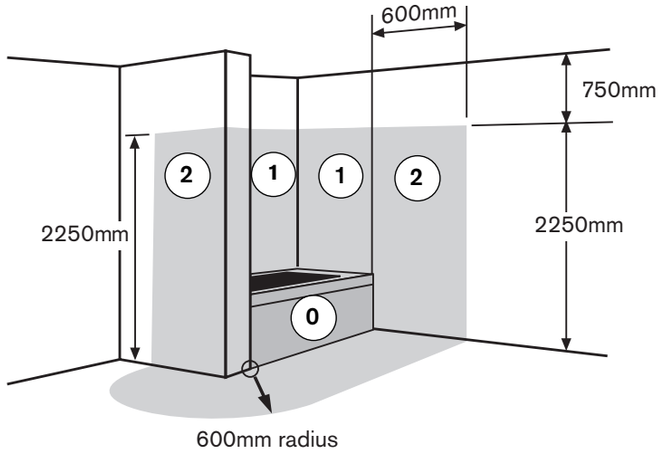
IMPORTANT: any appliance control using mains electricity must not be able to be touched by a person using the bath or shower.

Electrical switches, fused spur and socket outlets must not be fitted in the bathroom.

In all cases the IEE wiring regulations must be consulted.

All pipework in bathrooms and shower rooms must be cross bonded.





Minimum dimension of the flue terminal position for oil fired appliances:

TERMINAL POSITION		CF	RS(H)	RS(V)
A[1 4]	Directly below an opening, air brick, opening window, etc	N/A	600mm	N/A
B[1 4]	Horizontally to an opening, air brick, opening window, etc	N/A	600mm	N/A
C[8]	Below a plastic/painted gutter, drainage pipe or eaves if combustible material protected	N/A	75mm	N/A
D[8]	Below a plastic/painted gutter, drainage pipe or eaves without protection to combustible material	N/A	600mm	N/A
E	From vertical sanitary pipework	N/A	300mm	N/A
F[3]	From an external or internal corner or from a surface or boundary alongside the terminal	N/A	300mm	N/A
G[5]	Above ground or balcony level	N/A	300mm*	N/A
H[3]	From a surface or boundary facing the terminal	N/A	600mm**	N/A
J	From a terminal facing the terminal	—	1200**mm	—
K	Vertically from a terminal on the same wall	N/A	1500mm	N/A
L	Horizontally from a terminal on the same wall	—	750mm	—
M	Above the point of highest intersection with the roof	600mm	—	600mm
N[2]	From a vertical structure on the side of the terminal	750mm	—	750mm
O[2]	Above a vertical structure less than 750mm from the side of the terminal	600mm	—	600mm
P[2]	From a ridge terminal to a vertical structure on the roof	1500mm	—	N/A
Q	Above or to the side of any opening on a flat or sloping roof	300mm	—	300mm
R	Below any opening on a sloping roof	1000mm	—	1000mm

Key: *— Not applicable, N/A Not allowed, CF Conventional flue, RS(H) Room Sealed Horizontal flue, RS(V) Room Sealed Vertical flue.*

Notes:

1. *Terminals should be positioned so as to avoid products of combustion accumulating in stagnant pockets around the building or entering into buildings.*

2. *Vertical structure in N, O and P includes tank or lift rooms, parapets, dormers etc.*

3. *Terminating positions should be at least 1.8m from an oil storage tank unless a wall with at least 30 min fire resistance and extending 300mm higher and wider than the tank is provided between the tank and the terminating position.*

4. *Where a flue is terminated less than 600mm away from a projection above it and the projection consists of plastics or has a combustible or painted surface, then a heat shield of at least 750mm wide should be fitted.*

5. *If the lowest part of the terminal is less than 2m above the ground, balcony, flat roof or other place to which any person has access, the terminal should be protected by a guard.*

6. *Notwithstanding the dimensions given above, a terminal should not be sited closer than 300mm to combustible material. In the case of a thatched roof, double this separation distance should be provided. It is also advisable to treat the thatch with a fire retardant material and close wire in the vicinity of the flue.*

7. *It is essential that a flue or chimney does not pass through the roof within the shaded area delineated by dimensions Q and R.*

8. *Where protection is provided for plastic components, such as guttering, it is essential that this is to the standard specified by the manufacturer of the plastic components.*

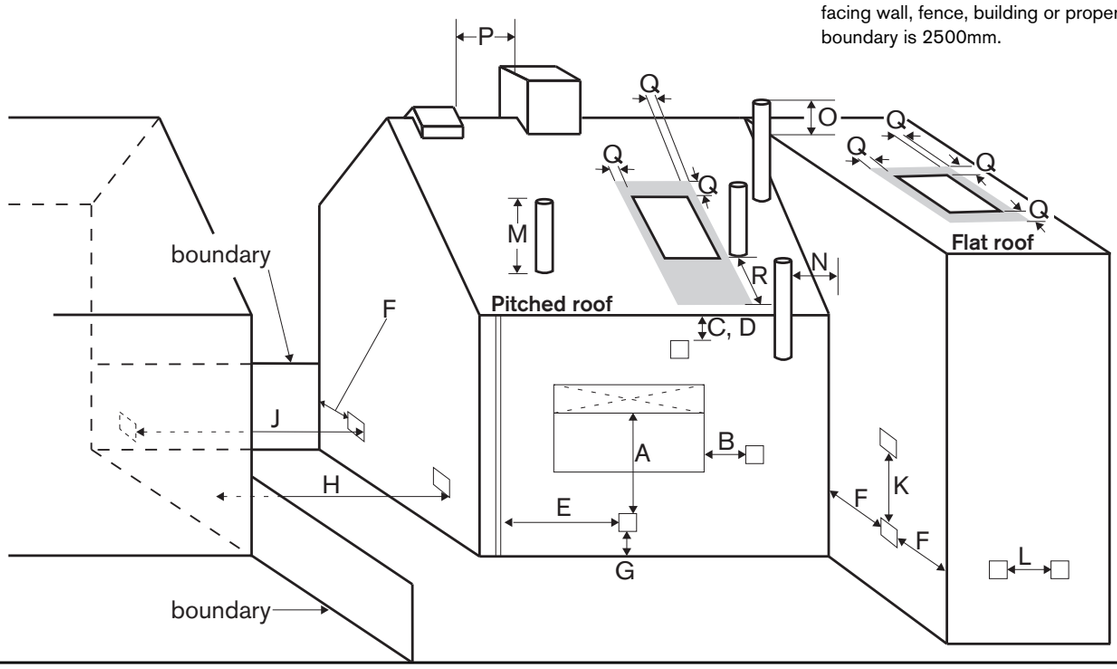
FLUE TERMINAL POSITIONS

- Flue terminals must be positioned to avoid combustion products entering into buildings.
- The flue must be fitted and terminated in accordance with the recommendations of BS 5410.
- The flue must not cause an obstruction.
- Discharge from the flue outlet must not be a nuisance.
- Flue gases have a tendency to plume and in certain weather conditions a white plume of condensation will be discharged from the flue outlet which could be regarded as a nuisance, for example, near security lighting.
- There should be no restriction preventing the clearance of combustion products from the terminal.
- The air inlet/outlet duct and the terminal of the boiler must not be closer than 25mm to any combustible material. Detailed recommendations on protection of combustible materials are given in BS 5410:1
- A protective terminal guard must be fitted if the terminal is 2m or less above a surface where people have access.
  The guard must be spaced equally (minimum 50mm) around the flue and fixed to the wall with plated screws.

Stainless steel terminal guard.
Part No: 7 716 190 050

The following additional guidelines (from part L Exceptions Guidance Document) are recommended when determining the flue outlet position:

- Avoid discharging flue gases into car ports or narrow passageways.
- *Minimum distance of the flue terminal from above ground is 2100mm where directed to a public footpath, private access route or a frequently used area and 2500mm from a car parking area.
- **Minimum distance of the flue terminal to a facing wall, fence, building or property boundary is 2500mm.



PRE - INSTALLATION

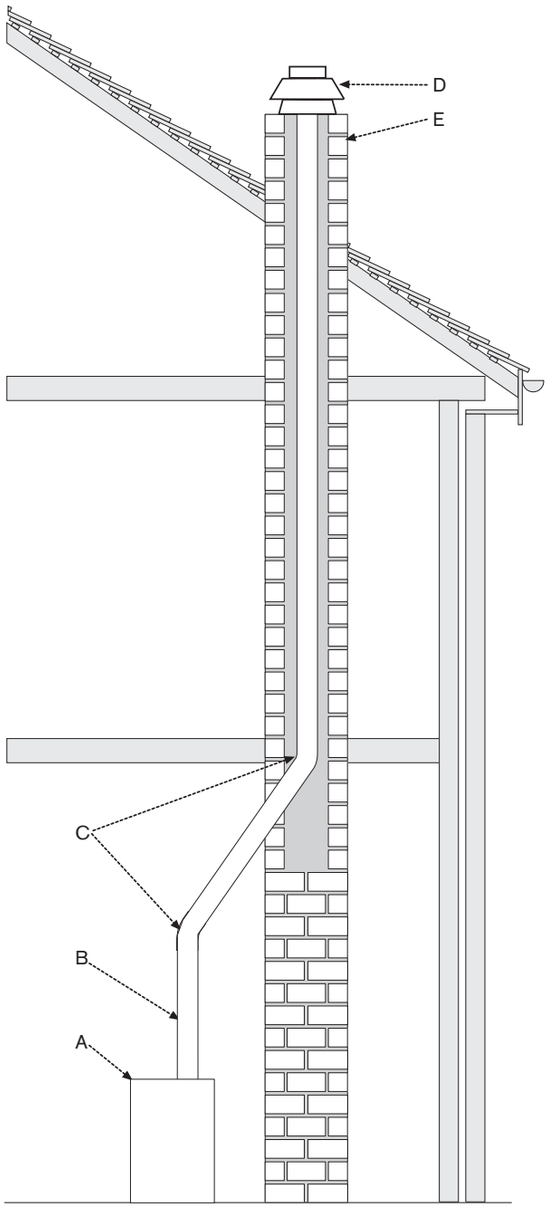
CONVENTIONAL FLUE

- Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bedsitting room.
- The flue system must be in accordance with BS 5410 : Part 1 and the current Building Regulations.
- The flue must be constructed of materials suitable for use with condensing combustion products.
- External flue systems must be of the insulated type.
- Brick and masonry chimneys must be lined with a suitable non-combustible material and properly jointed to withstand the effects of the working temperature (minimum rating of material 120°C) of the appliance and any condensate which may form.
- All flue joints must be sealed to prevent the leakage of condensate and combustion products.
- Ensure that joints are made so that the condensate runs away and is not collected within the joint.

NOTE: The flue can be increased in size from the boiler take off point providing the joint is correctly sealed. Never reduce the flue diameter from the boiler take off point.

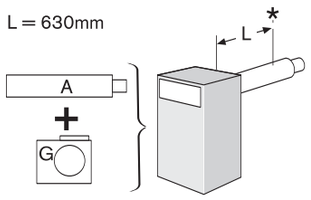
CF Sizing:
- 32/50 & 50/70 = 150mmØ

- Because the flue operates at a lower temperature on a condensing boiler compared to that of a conventional appliance, the flue draught will be lower. Typically the draught will be between 0.5mmwg and 4.4mmwg, measured with the flue warm but the burner not firing. The actual figure will vary depending on weather conditions, flue height and position.
- The flue should be vertical and contain as few bends as possible, a maximum of two 135° bends should be used.
- The flue outlet must be extended beyond the eaves of the building and where possible, above the apex.
- Fit a suitable anti down-draught terminal where down draughts are experienced.

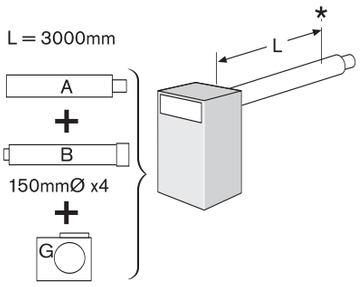


A - Boiler
B - Flue
C - Max. 2 bends at 135°
D - Anti down-draught terminal
E - Chimney

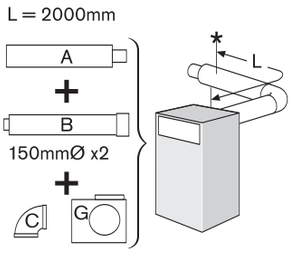
L = 630mm



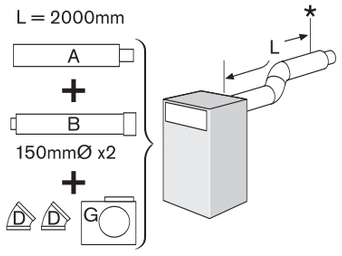
L = 3000mm



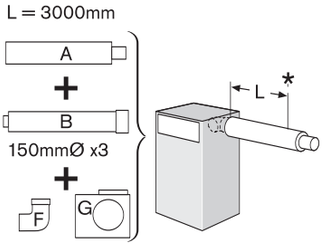
L = 2000mm



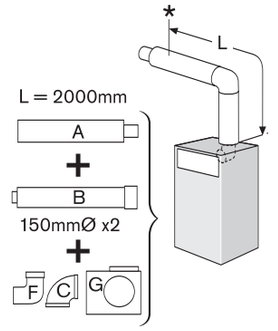
L = 2000mm



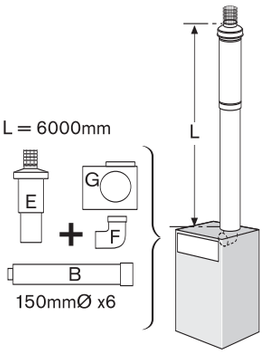
L = 3000mm



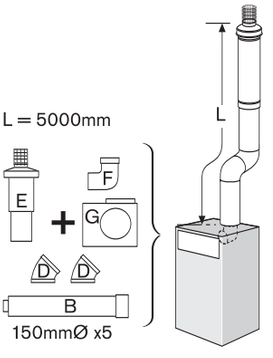
L = 2000mm



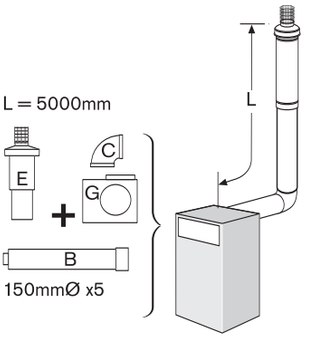
L = 6000mm



L = 5000mm



L = 5000mm



ROOM SEALED FLUE OPTIONS

The diagrams (opposite) show the components used and the maximum flue length (L) from the boiler outlet to the ouside wall*/roof of the building for each flue configuration.

In all cases L is measured from the outside of the boiler casing.

- To achieve the maximum flue length (L), a flue section will have to be reduced in length.
- Only the flue terminal or straight flue extensions can be reduced in length by cutting.
- The flue terminal end can be fitted from the inside or outside of the building.

IMPORTANT: All horizontal sections must rise away from the boiler by 52mm per metre (3°) to allow the condensate to drain back to the boiler.

A - Horizontal terminal
B - Straight flue extension
C - Flue bend 90°
D - Flue bend 45°
E - Vertical Terminal
F - 90° inner elbow - inner flue to boiler
G - Air intake box

Calculating the flue length:

Measure the total flue length required, noting that the maximum straight flue length including the terminal is:

Horizontal 100/150mmØ: 3000mm (excluding 220mm of terminal extending outside the building)

Vertical 100/150mmØ: 6000mm (measured from the boiler top panel).

Then reduce the total straight flue length for each extra flue bend (excluding the vertical flue kit 90° elbow) by:

1000mm for 90°

500mm for 45°

Flue Extension lengths:

Horizontal & Vertical 100/150mmØ: 1000mm overall length.

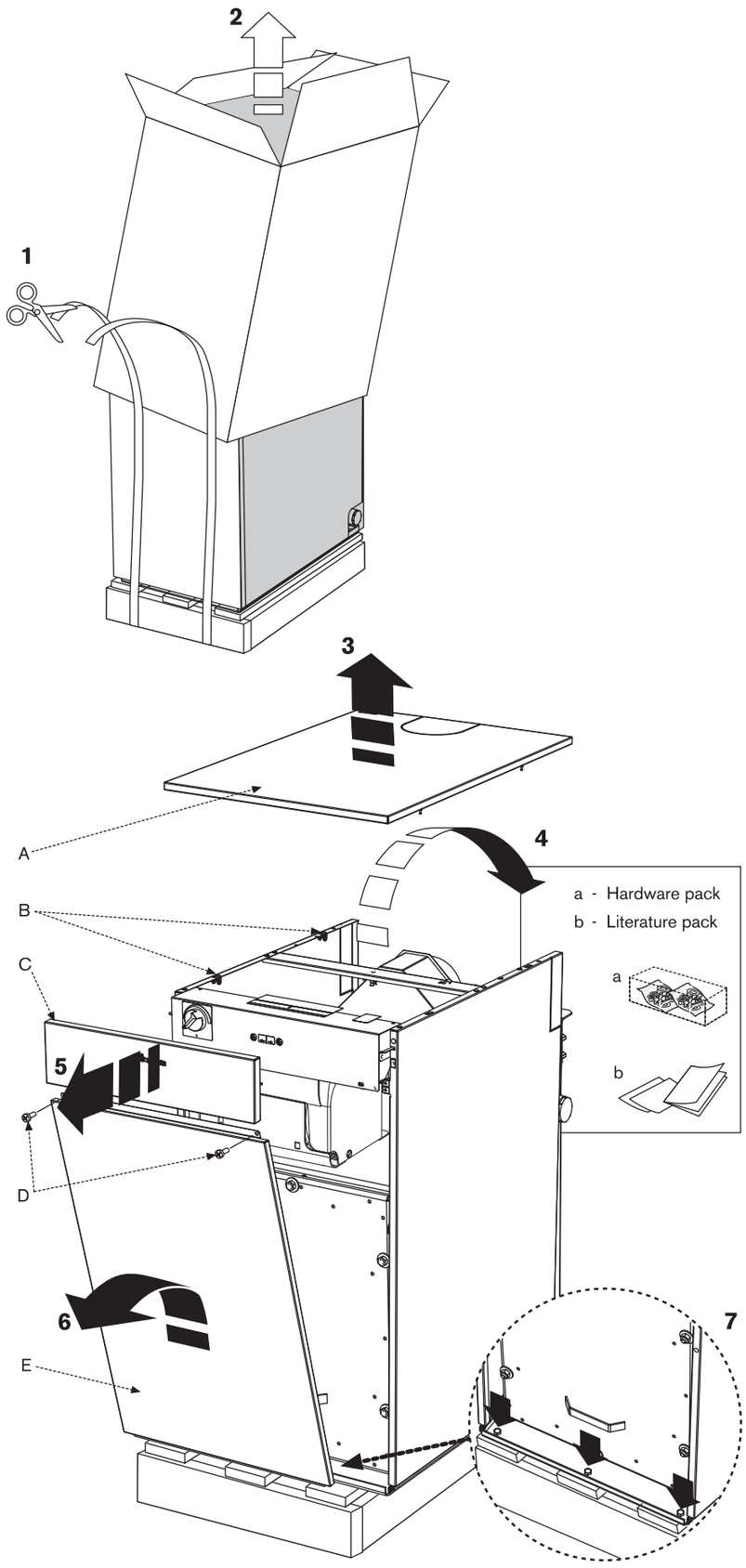
Effective length when engaged into sockets within the flue run is 950mm.

Flue Terminal lengths:

Horizontal 100/150mmØ: 1000mm
Vertical 100/150mmØ: 1290mm + cage

* **to outside wall.**

IMPORTANT: All the previous Pre-Installation sections must be read and requirements met before starting boiler or flue installation.



UNPACKING THE BOILER

LIFTING AND CARRYING PRECAUTIONS:

- Lift only a manageable weight, or ask for help.
- When lifting or putting things down, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry objects close to the body.
- Wear protective clothing and gloves to protect from any sharp edges.

Unpacking:

It is advised that two or more persons are involved in the transfer of the packaged boiler from the van to the point of delivery.

1 ▸ Once the packaged boiler has been delivered, the outer carton is removed first. Care should be taken when releasing the straps. If a sharp implement is used make sure the outer carton is not pierced and that the implement is used in such a way so that it may not cause personal injury. All sharp objects must be covered or the blade retracted after use and put away in a safe place.

2 ▸ Lift carton up and away from the boiler.

▸ Remove the plastic bag and upper front protection cover from the boiler and place safely aside.

3 ▸ Lift top panel (A) upwards to disengage ball stud connectors (B) and remove.

4 ▸ Extract the ancilliary items (a) & (b).

5 ▸ Pull the upper front panel (C) forwards to disengage the balll stud connectors.

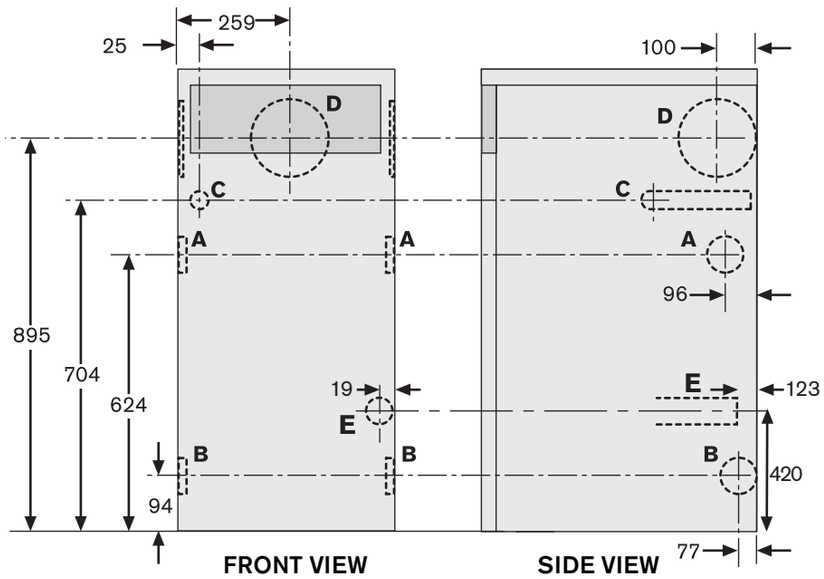
6 ▸ Remove securing screws (D) from front panel (E).

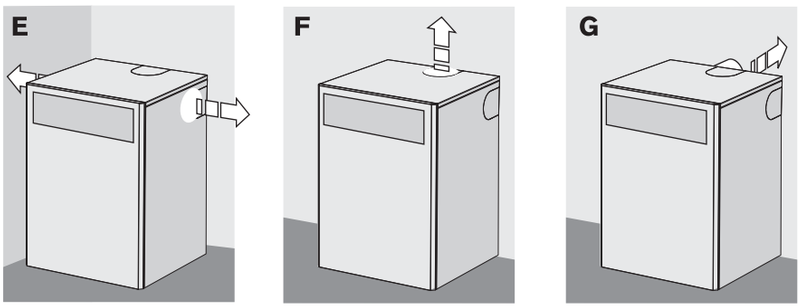
▸ Pull front panel (E) up and away from the supporting ledge on the boiler and store away from the working area.

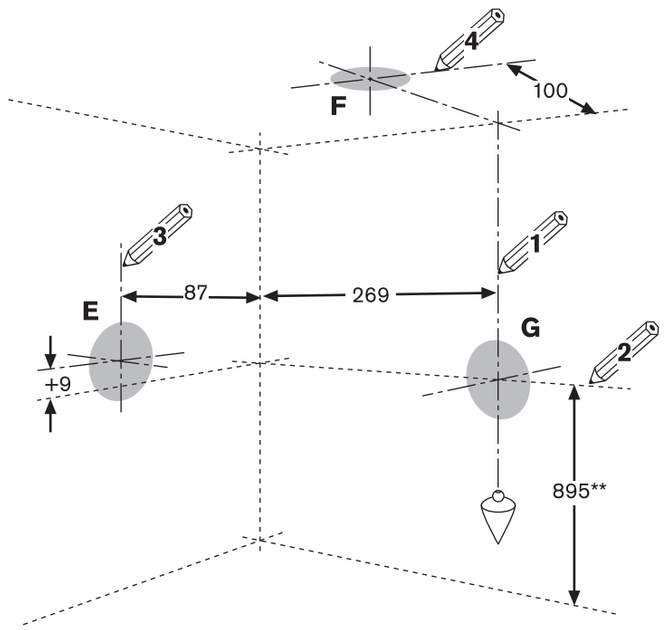
7 ▸ Remove the bolts securing the boiler to the transport pallet.

At all times the correct method for handling heavy objects should be strictly observed.

All dimensions in mm







PIPEWORK POSITIONS &

FLUE OPENING

CAUTION: Ensure there are no pipes, electric cables, damp proof courses or other hazards before drilling.

SAFETY:
All relevant safety precautions must be undertaken. Protective clothing, footwear, gloves and safety goggles must be worn as appropriate.

PIPEWORK POSITIONS:
A to D (opposite) show the flue and pipe positions:

A - CH flow /heating vent $1^1/_2$" Ø BSP
B - Primary drain/cold feed $1^1/_2$" Ø BSP
C - CH return 28mm Ø copper
D - Flue outlet
E - Condensate outlet 21.5mm Ø

NOTE: *For servicing purposes, keep the condensate and pressure relief discharge pipes away from components and pipework connections.*

FLUE OPENING:

- Follow the diagram opposite to mark the centre of the flue (1, & 2) for rear opening, (2 & 3) for side opening or (1 & 4) for top opening.

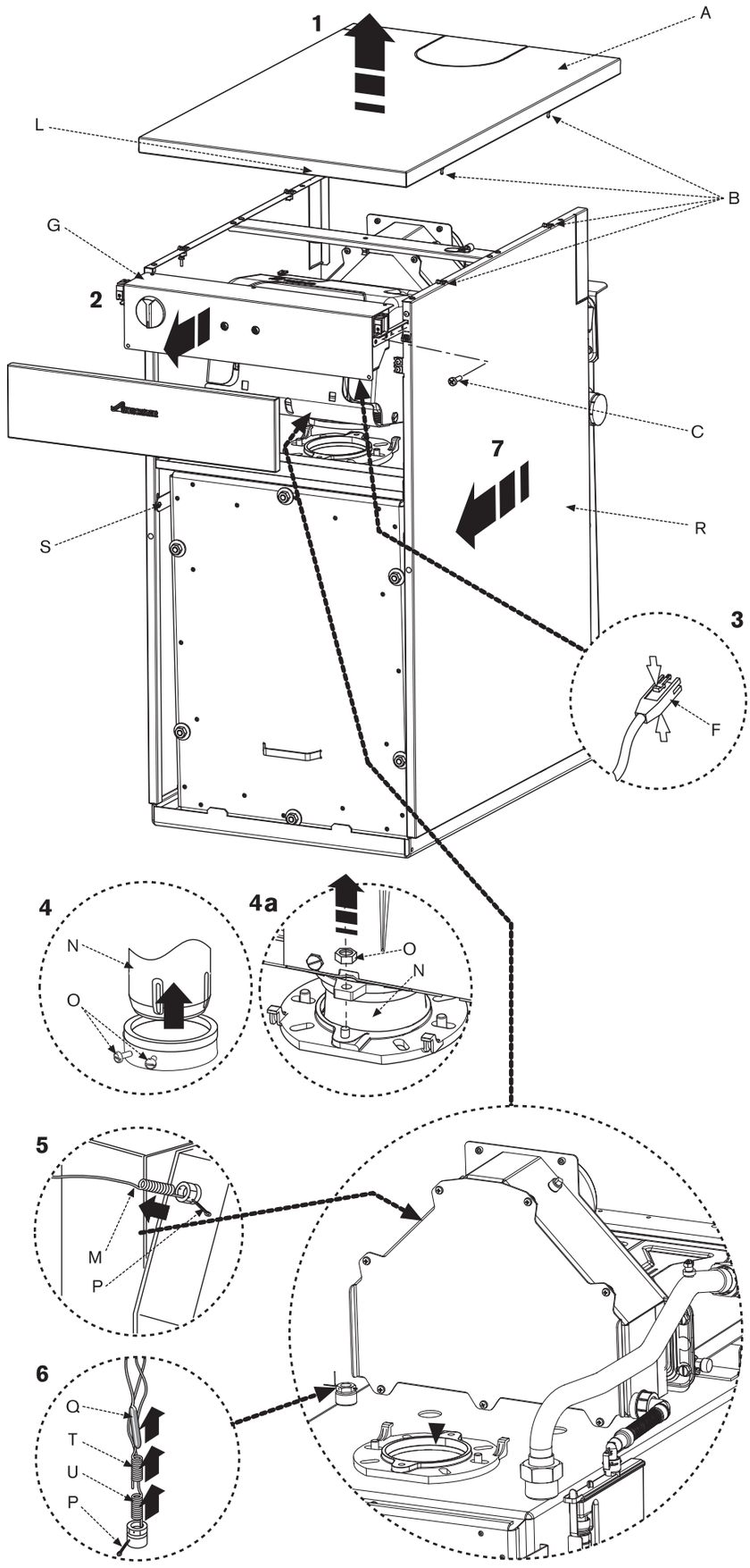
** **IMPORTANT**: for horizontal flues, increase this height by 52mm for every 1000mm of horizontal length that the flue opening is away from the boiler.

NOTE: *All horizontal flue sections must rise away from the boiler by 52mm per metre to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.*

- Make an opening (F, G or H) through the wall using a core drill or similar at a size relative to the wall thickness as shown below:

150mmØ flue:	
Wall thickness	**Flue hole size**
150 - 240mm	175mmØ
240 - 330mm	185mmØ
330 - 420mm	195mmØ
420 - 500mm	205mmØ

INSTALLATION



BOILER INSTALLATION

1 ▸ Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove.

2 ▸ Pull the upper front panel squarely forwards to disengage the ball stud connectors and remove from the control box (G).

- ▸ Remove securing screws (C) from each side.
- ▸ Slide control box (G) outwards to its full extent.

3 ▸ Depress locking ears to unplug burner lead (F) from cntrol box (G).

4 ▸ **Sterling burner:**

- ▸ Release burner retainers (O).
- ▸ Lift burner up to release blast tube (N) from heat exchanger and store safely away from the boiler.

4a ▸ **Riello burner:**

- ▸ Remove burner retainer nut (O).
- ▸ Lift burner up to release blast tube (N) from heat exchanger and store safely away from the boiler.

5 ▸ Release split pin (P) to remove the flue thermostat (M) from the flue hood.

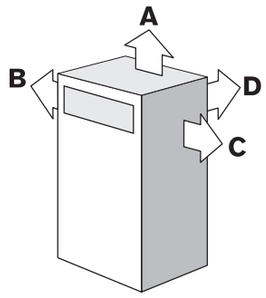
6 ▸ Release split pin (P).

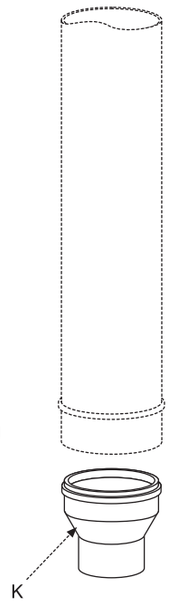
- ▸ Carefully remove the CH Control thermostat (Q), Automatic High Limit (T) and Manual Reset thermostat (U) philes from the heat exchanger thermostat pocket.

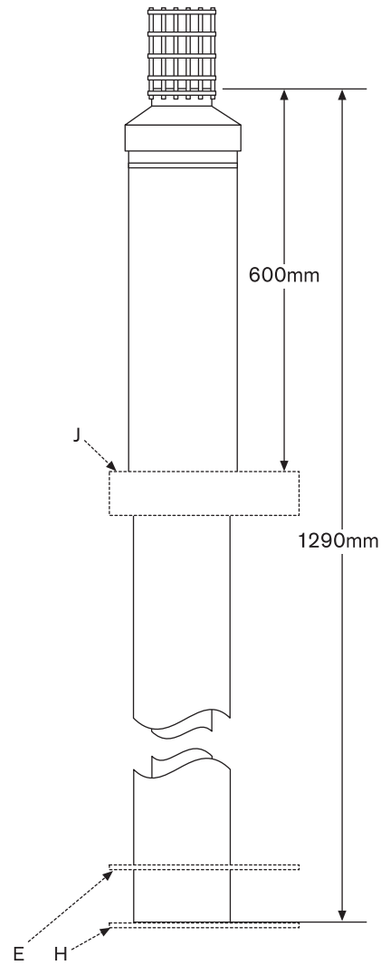
7 ▸ Unscrew side panel (R) retaining screws (S) from both sides.

- ▸ Slide both side panels together with the top support bracket (L) and control box (G) forwards to release the side panel retaining lugs.
- ▸ Remove and store safely away from the boiler.

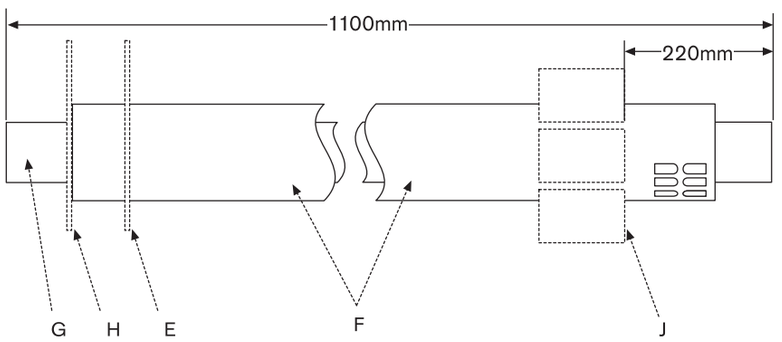
NOTE: *to enable the panels to stand upright, reposition and secure control box (G) to the side panels.*

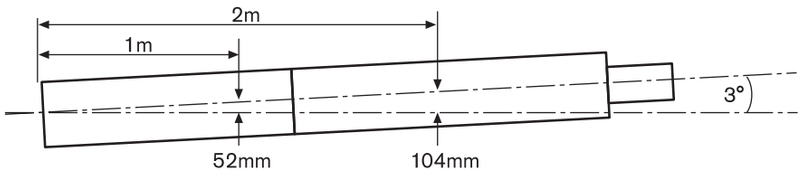






E - Boiler outer casing
F - Outer flue tube
G - Inner flue tube
H - Airbox outer casing
J - Outside wall/roof
K - CF adaptor





FLUE INSTALLATION

The flue can exit the boiler from outlets A, B, C or D allowing vertical (RS &CF) and horizontal (RS low or high level) flues to be fitted. (CF position 'A' only).
Refer to the separate flue installation instructions supplied with the flue kits available for this boiler:

RS FLUE KITS & COMPONENTS

Greenstar Oilfit 100/150mmØ (not supplied):

Horizontal flue kit: Part No. 7 716 190 043
Vertical flue kit: Part No. 7 716 190 044
Extension kit (1 metre) x1: Part No. 7 716 190 045
Inline elbow 90° x1: Part No. 7 716 190 046
Inline elbow 45° x2: Part No. 7 716 190 047

CF FLUE KITS & COMPONENTS:

Greenstar Oilfit 103mmØ (not supplied):

CF flue kit 130mmØ: Part No. 7 716 190 049

FLUE TERMINAL GUARD (not supplied):

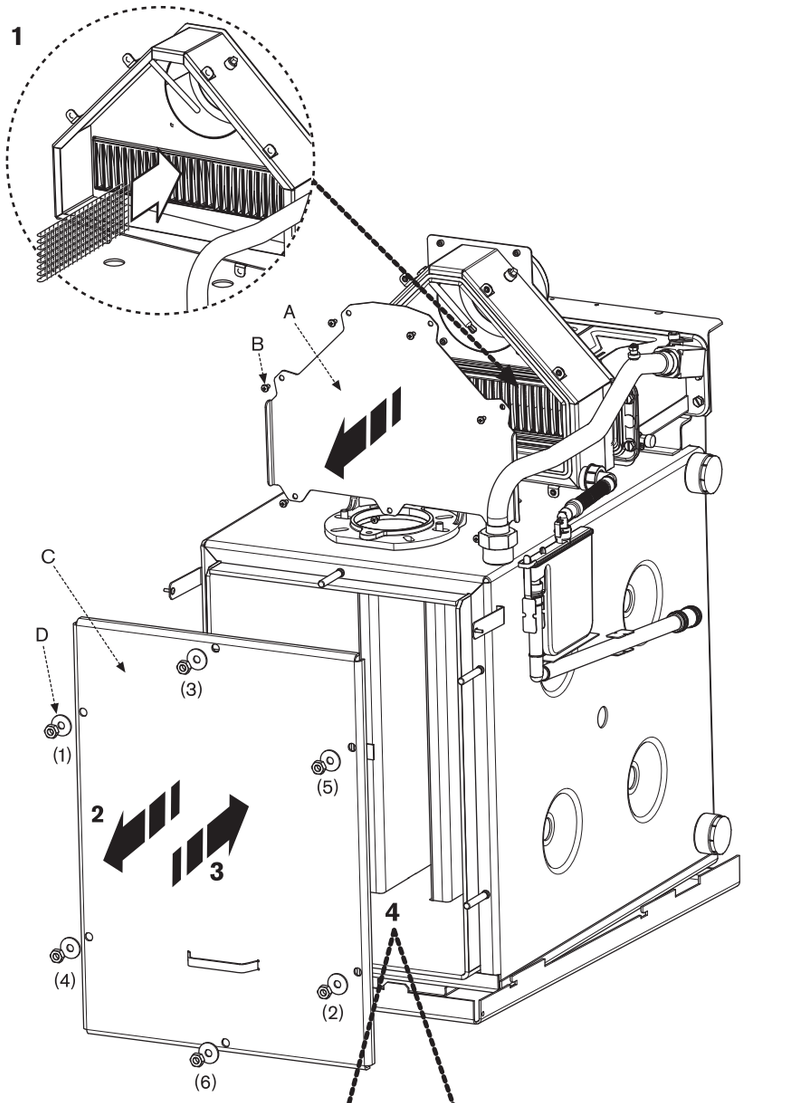
Terminal Guard: Part No. 7 716 190 050

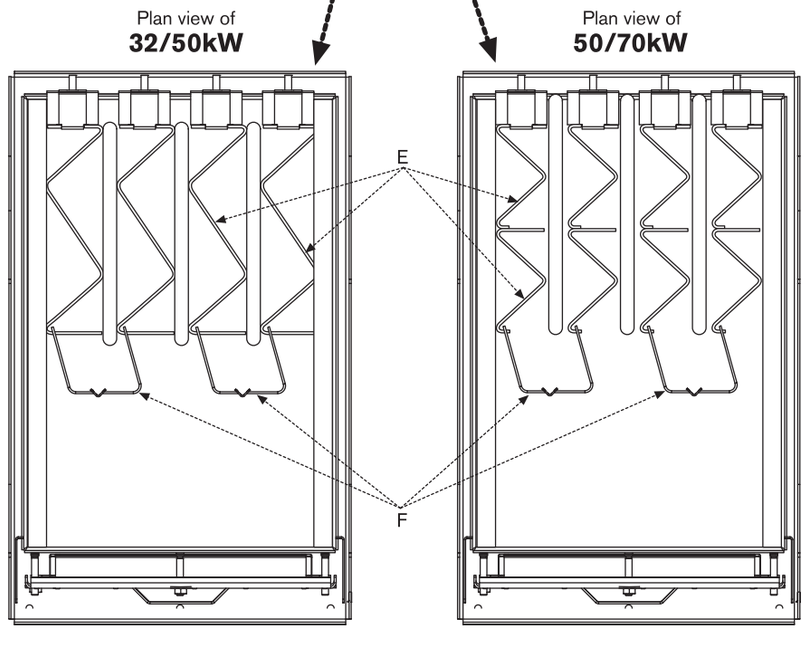
INSTALLATION NOTES:

- Ensure all flue seals are in good condition and seated properly.
- To ease assembly of flue components, grease seals lightly with the solvent-free grease.
- Use flue clamps, where supplied, to support the flue system.

IMPORTANT: The boiler is not designed to take the weight of the flue system, this must be supported externally to the boiler.

- All horizontal flue sections must rise by at least 52mm for each metre away from the boiler to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.
- The horizontal terminal must be installed at 3° to ensure that the condensate drains back to the boiler whilst also preventing rain ingress down the air duct.
- A flue terminal guard must be fitted if the flue outlet is below 2 metres from the ground level.





COMBUSTION CHAMBER

Secondary heat exchanger:

1 ▸ Unscrew screws (B) and remove flue manifold access cover (A).

▸ Check that all the baffles and retainer are correctly fitted to the secondary heat exchanger:

	SLOTS	DOUBLE BAFFLES	SINGLE BAFFLES
32/50kW*	25	10	N/A
50/70kW	31	15	1

**Five of the slots do not have baffles.*

Combustion chamber:

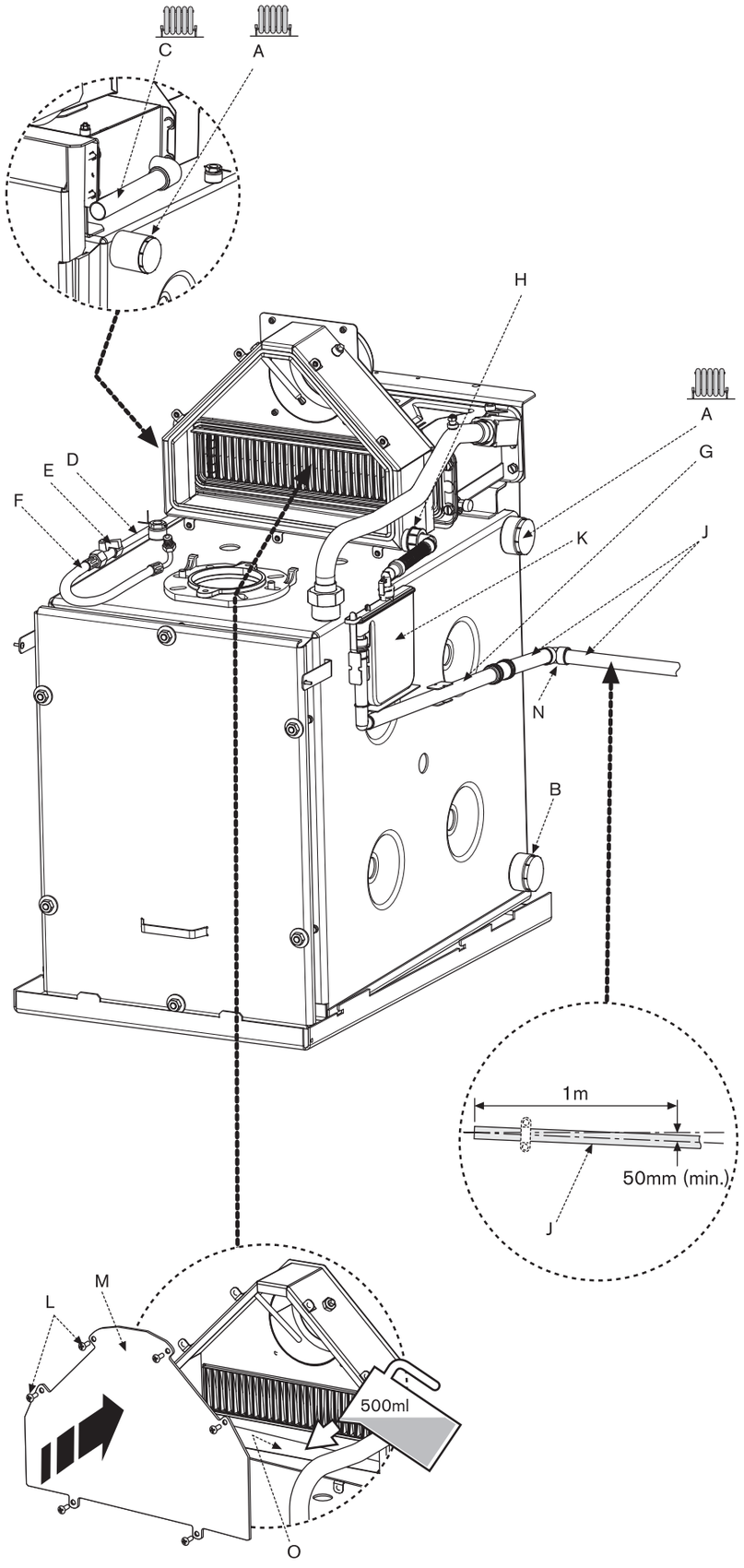
2 ▸ Remove the retaining nuts and washers (D).

▸ Remove combustion chamber access door (C).

3 ▸ Remove the transit packaging and ensure the baffles (E) and baffle retainer (F) are correctly fitted for the boiler output as shown in the plan views below.

4 ▸ Refit combustion chamber door (C).
IMPORTANT: Secure with nuts and washers (D) and tighten gradually in the sequence (1-6) shown until the chamber door is firmly secured, do not over tighten the nuts.

CAUTION: ISOLATE THE OIL & WATER MAINS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.



PIPEWORK CONNECTIONS

A - CH flow /heating vent $1^1/_2$" Ø
B - Primary drain/cold feed/drain $1^1/_2$" Ø
C - CH Return 22mmØ copper - male
D - Oil supply pipe - not supplied
E - Oil isolating valve - not supplied
F - Flexible oil hose*
G - Condensate outlet (21.5mmØ) - supplied
H - Flue manifold condensate outlet
J - Condensate pipe - not supplied
K - Internal condensate trap
N - 90° elbows

WATER CONNECTIONS:

- Remove the transit bungs from the pipework connections on the boiler.

  NOTE: *That surplus water may be present due to factory testing.*
- Ensure all pipework is clean.
- Align water pipework and connect.
- Fit a drain cock to either of the primary cold feed/drain points (B).
- Check that all unused sockets have been capped.

OIL SUPPLY CONNECTIONS:

- Route oil supply pipe (D) along either side of the boiler as required, finishing close to the burner. Avoid hot surfaces.
- Connect the oil supply pipe (D) to the isolating valve (E), ensure the valve is closed.

  ****NOTE:*** *Replace flexible hose at annual service to prevent possible oil leakage.*
- Connect the flexible oil hose (F) to the isolating valve (E).

CONDENSATE CONNECTION:

- Connect 21.5mm polypropylene pipe (J) (not supplied) to the condensate waste pipe (G) flexible push fit connector and terminate to waste.
- Do not use any solvents, adhesives or lubricants when pushing the pipe into the rubber connector.
- Ensure that the condensate pipe runs away from the boiler at a constant fall of 50mm (min.) for every metre.
- Seal all condensate pipe joints.
- **Carefully pour 500ml of water into the condensate collection (O) to fill condensate trap (K).**
- Check the water is running away and the condensate pipework joints are water tight.
- Check the flue manifold seal is undamaged and seated correctly.
- Refit flue manifold access cover (M) and secure with screws (L).

IMPORTANT: The condensate trap must be correctly filled to prevent the possibility of potentially harmful flue products escaping via the condensate pipework.

32/50kW

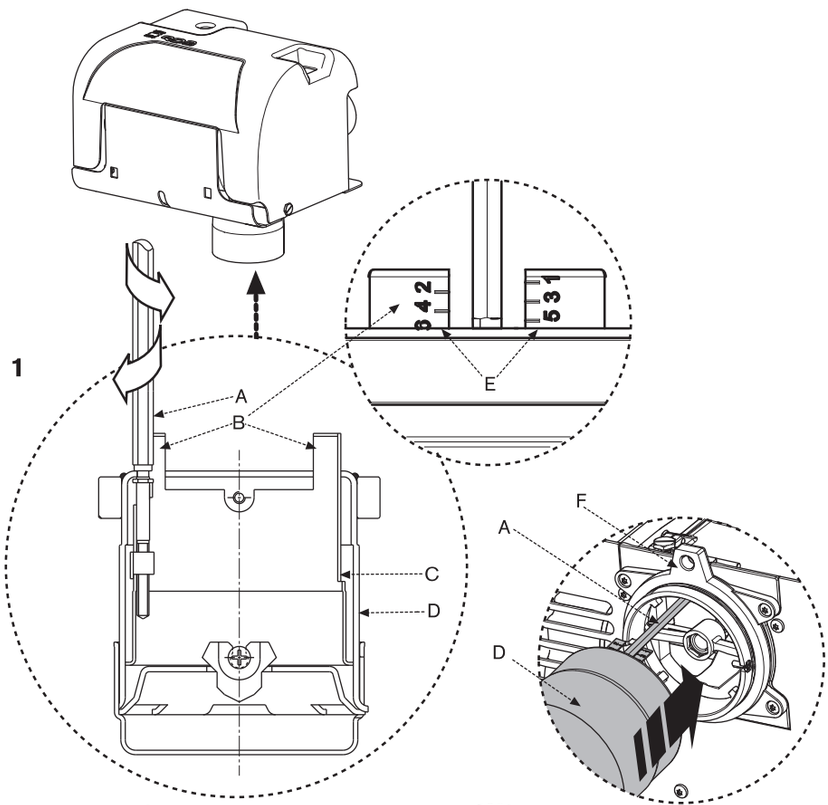
RIELLO RDB 3.2 BURNER SETTINGS

Output	Combustion head setting (B)
kW	Set at top of combustion head (E)
32	3
41	4
50	5

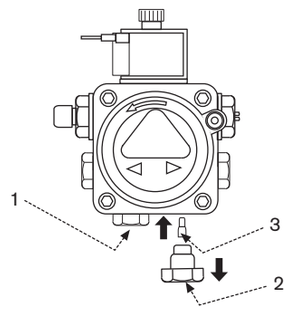
50/70kW

RIELLO RDB 4.2 BURNER SETTINGS

Output	Combustion head setting (B)
kW	Set at top of combustion head (E)
50	1
60	2
70	3



RIELLO RDB OIL PUMP



CAUTION: ISOLATE THE OIL & WATER MAINS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

OIL BURNER:

1. **RIELLO RDB 3.2**
2. **RIELLO RDB 4.2**

- Remove the combustion head from the burner by removing the two opposing screws at the top of the combustion head.
- Adjust the the combustion head setting (B) so that it is correct for the relevant output as shown in the table opposite.
- To adjust the combustion head setting (B), turn the adjustment bar (A) clockwise or anti-clockwise to move the inner sleeve (C) up and down the blast tube (D). The correct setting is shown when the relevant number on the scale (B) is in line with the top of the blast tube (E).
- The electrodes and nozzle are factory set and there is no need to adjust them.
- With the adjustment bar (A) in line with the top of the burner (F) return the combustion head and secure in place with the two screws at the top of the blast tube.

OIL PUMP:

Connecting the oil pump for a single pipe system:

The pump is factory set for single pipe operation with the flexible oil hose fitted. Check connections before use.

Converting the oil pump for a double pipe system:

1 ▸ Check the inlet hose connection.

RIELLO RDB:

- Unscrew return plug (2).
- Screw in by-pass screw (3).

2 ▸ Connect the flexible oil **return** hose (not supplied) between the oil pump and the return line connection, and tighten to secure.

32/50kW

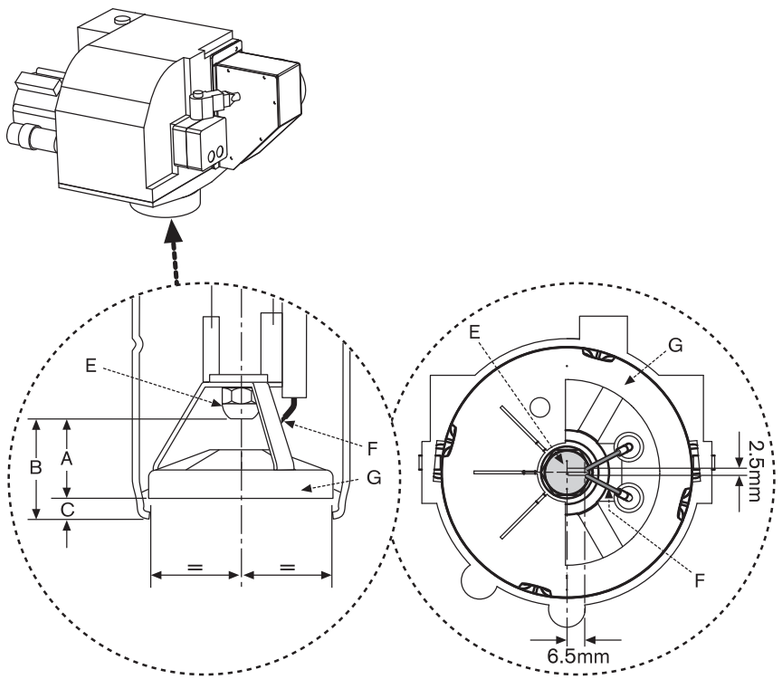
STERLING 133 BURNER SETTINGS:

Output	Dimensions (mm)		
kW	A	B	C
32	22	26	4
41	29	34	5
50	29	35	6

50/70kW

STERLING 146 BURNER SETTINGS:

Output	Dimensions (mm)		
kW	A	B	C
50	27	35	8
60	33	41	8
70	33	46	13



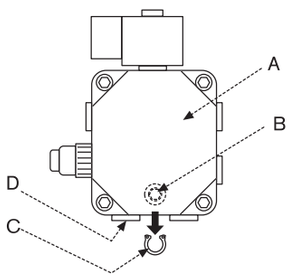
A - Nozzle to front of break plate

B - Nozzle to front of blast tube

C - Front of break plate to front of blast tube

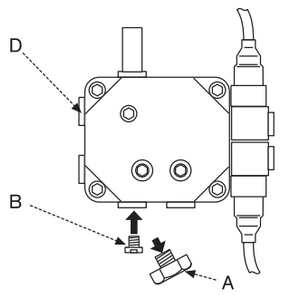
32/50kW

a) DANFOSS BFP 11 L3 OIL PUMP



50/70kW

b) DANFOSS BFP 52E L3 OIL PUMP



CAUTION: ISOLATE THE OIL & WATER MAINS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

OIL BURNER:

1 ▸ Check the nozzle (E) settings are correct for the relevant burner as shown opposite.

▸ Ensure nozzle (E) is aligned centrally within the breakplate (G).

▸ Inspect for any visible defects.

IMPORTANT: The electrode assembly must be positioned at 3 o'clock as shown in the diagram.

IMPORTANT: Whenever replacing the combustion head, ensure that the photocell is lined up with the sight hole.

OIL PUMP:

Connecting the oil pump for a single pipe system:

The pump is factory set for single pipe operation with the flexible oil hose fitted. Check connections before use.

Converting the oil pump for a double pipe system:

1 ▸ Check the inlet hose connection.

a) DANFOSS BFP 11 L3:

▸ Remove pump front cover (A) ensuring a suitable receptacle is used to catch any oil residue.

▸ Remove changeover screw (B).

▸ Remove horseshoe washer (C).

▸ Refit changeover screw (B).

▸ Refit front cover (A).

▸ Remove oil pump return plug (2).

▸ Connect flexible oil return hose.

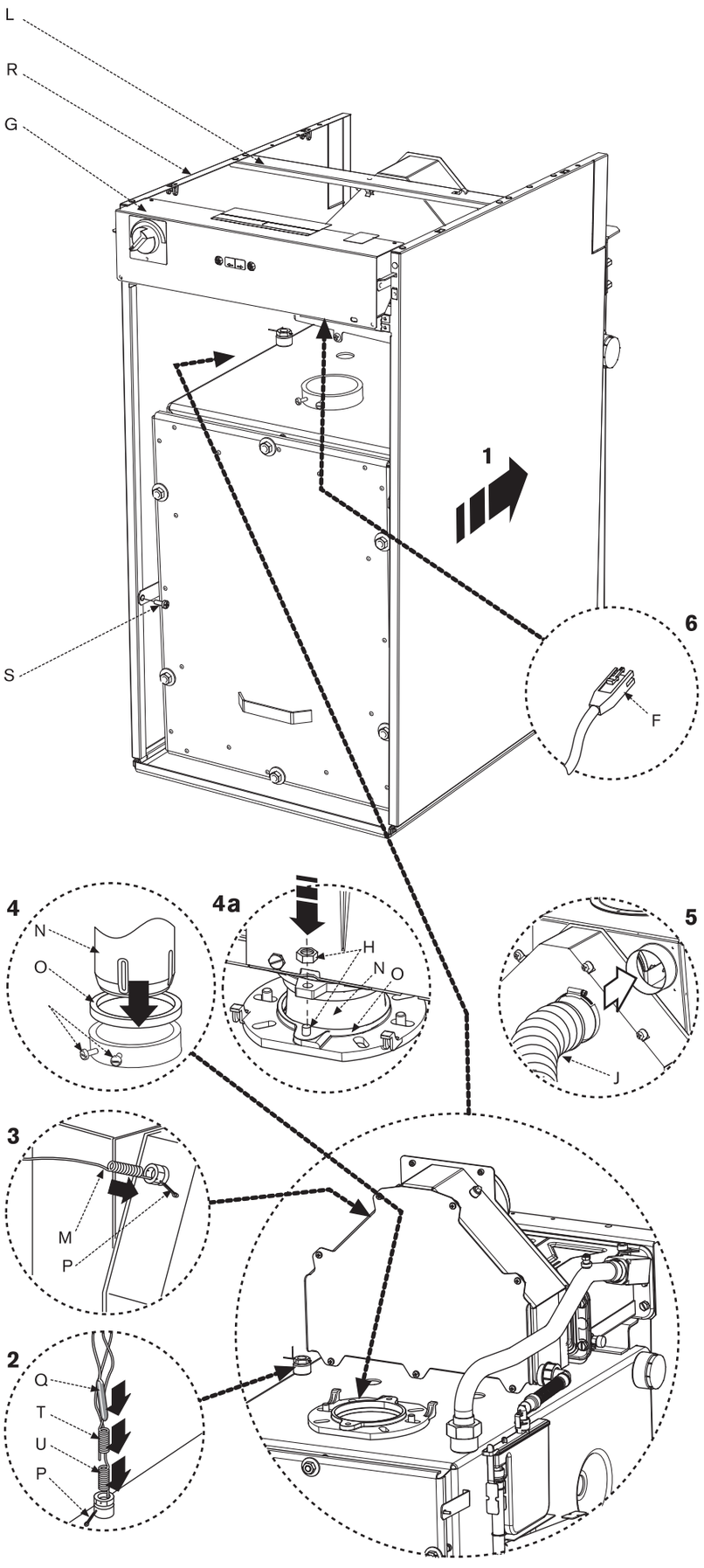
b) DANFOSS BFP 52E L3:

▸ Remove plug (A) and screw in grub screw (B).

▸ Refit plug (A).

▸ Remove oil pump return plug (D).

▸ Connect the flexible oil return hose to the



REFITTING COMPONENTS

1 ▸ Slide side panels (R) and top support bracket (L) together with control box (G) along base rails and push to secure into the retaining lugs.

▸ Secure side panel (R) with retaining screws (S) on both sides.

2 ▸ Carefully replace the Manual Reset thermostat (U), Automatic High Limit (T) and CH Control thermostat (Q) phials into the heat exchanger thermostat pocket.

▸ Refit split pins (P) to secure.

3 ▸ Carefully replace the flue thermostat (M) into the flue hood and refit split pin.

4 ▸ **Sterling burner:**
Align burner combustion head (N) into boiler housing tube with gasket (O) correctly fitted.

▸ Push firmly down to compress the gasket (O).

▸ Tighten burner retainers (H) sufficiently to ensure a good seal.

4a ▸ **Riello burner:**
Align burner combustion head (N) into boiler housing tube flange (O).

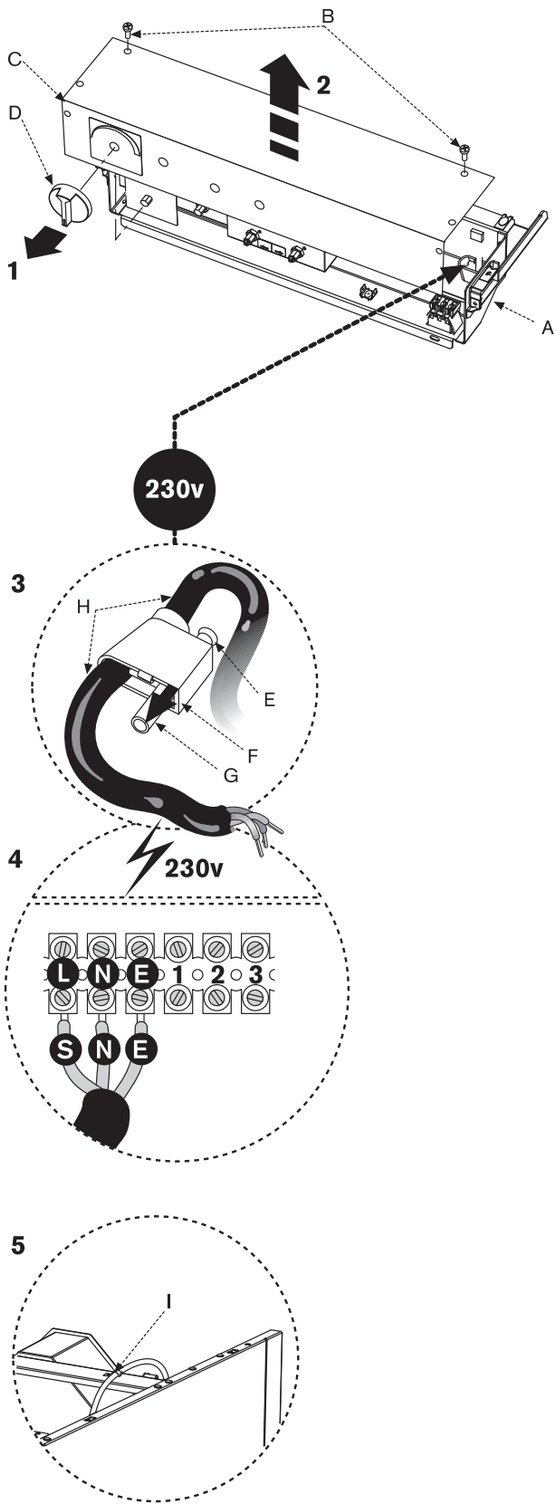
▸ Secure with retaining nut (H).

▸ Tighten retaining nut sufficiently to ensure a good seal.

IMPORTANT: Ensure the gasket is a good seal between the burner combustion head and the boiler housing to prevent flue gases escaping from the combustion chamber into the room.

5 ▸ **RS flue only:**
attach air duct and tighten clip (J) to secure to the burner air intake box and the burner air intake.

6 ▸ Plug burner lead (F) into control box (G).



E = EARTH
L = LIVE
N = NEUTRAL
S = SWITCHED LIVE

ELECTRICS

DANGER - 230V:
ISOLATE THE MAINS ELECTRICITY SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

IMPORTANT: OBSERVE ELECTRONIC STATIC DISCHARGE PRECAUTIONS. DO NOT TOUCH THE PCB CIRCUITS.

Access to 230V connections:

1 ▸ Pull control knob (D) forwards to remove from control panel (A).

2 ▸ Release scews (B) and remove cover panel (C) from control box (A).

3 ▸ Release screw (E) from cable clamp (F).
- ▸ Pull inner clamp part (G) outwards.
- ▸ Feed sufficient power cable (H) through the cable clamp (F) and secure grip with screw (E).
- ▸ Separate wires from cable end and strip to 6mm.

230V connections:

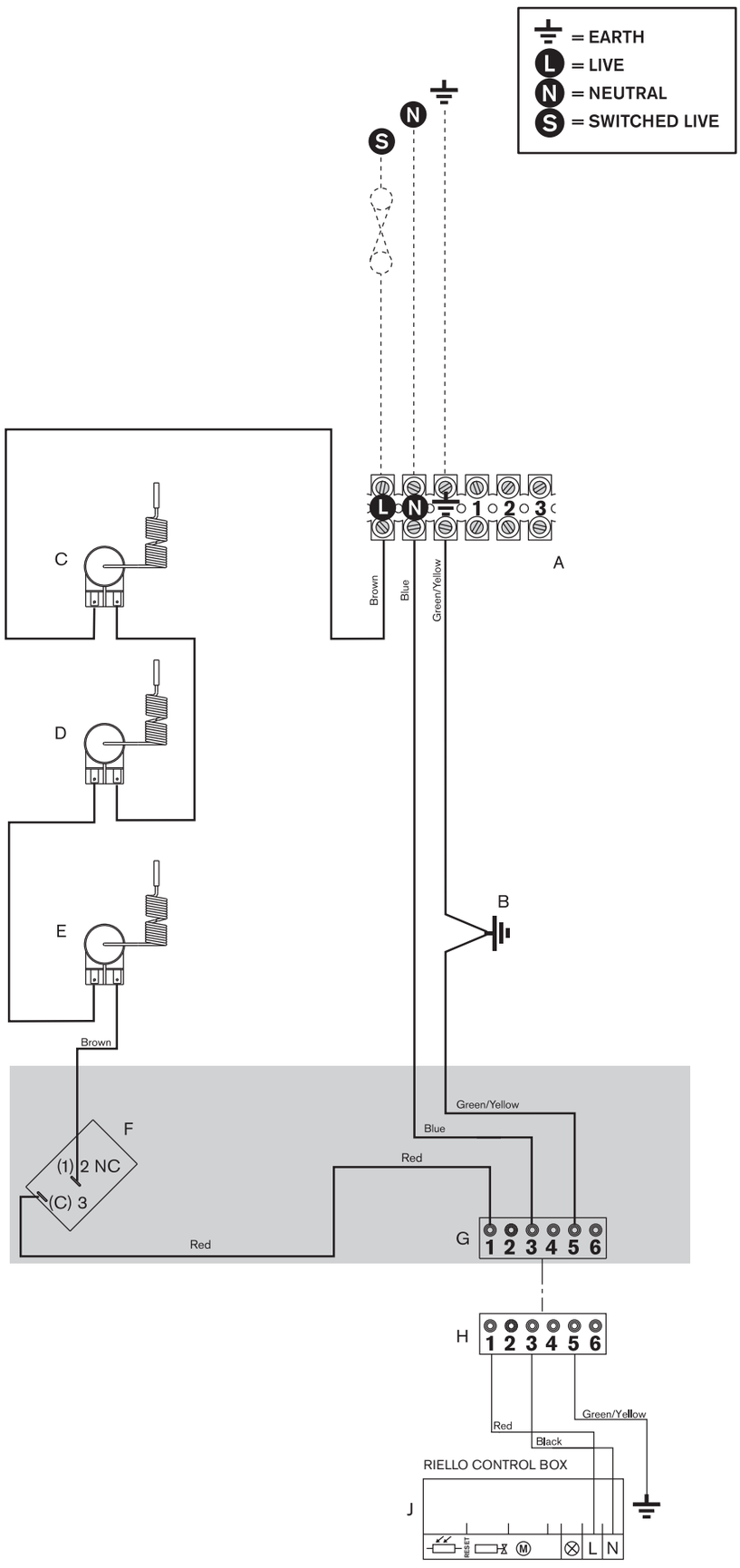
4 ▸ Connect SWITCHED LIVE wire (Brown or RED) to terminal L.
- ▸ Connect NEUTRAL wire (Blue or Black) to terminal N.
- ▸ Connect EARTH wire (Green/Yellow) to the terminal ⏚.

5 ▸ Secure the cable to the cable clamp (I).
Route the power cable to the external connection point avoiding any potentially hot surfaces allowing sufficient cable to pivot the control box into the service position. Open the control box into the service position to check the cable length and routing.

Any external device connected to the boiler must take its power supply from the boiler only and must NOT have a separate supply.

See the following pages of electrical diagrams for details of different systems.

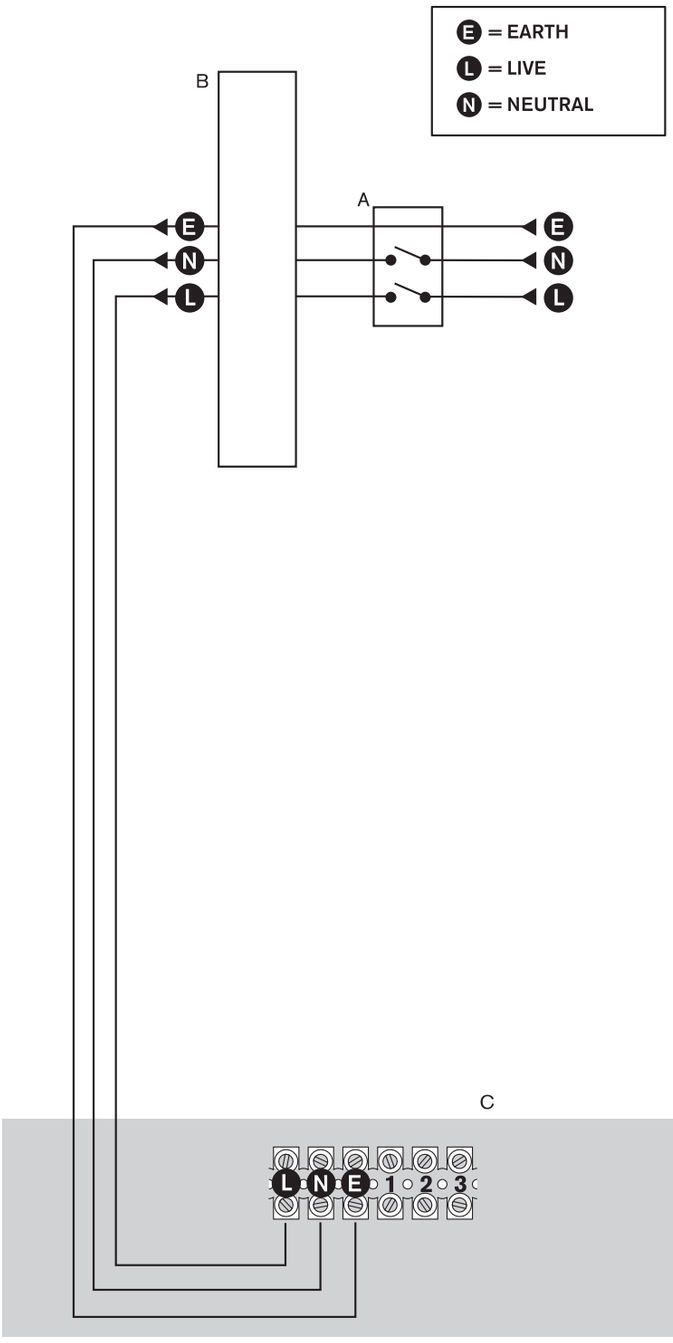
Refit electric control panel cover:
- ▸ Refit cover panel (C) to control box (A) and secure with screws (B).
- ▸ Refit control knob (D).



230V STANDARD WIRING DIAGRAM:

Key to components:

A - TERMINAL CONNECTOR BLOCK.
B - EARTH CONNECTOR.
C - FLUE THERMOSTAT (MANUAL RESET)
D - HEATING THERMOSTAT (AUTOMATIC RESET)
E - HEATING THERMOSTAT (MANUAL RESET).
F - CONTROL THERMOSTAT.
G - BURNER SOCKET.
H - BURNER PLUG.
J - BURNER CONTROL BOX.



PRE-WIRED REMOTE 2 OR 3 PORT VALVE CONTROL SETS:

Key to components:

A - Double pole switched fused spur (positioned in the boiler room next to the appliance.

B - REMOTE JUNCTION BOX (10 way) to connect the following:

- Mains wiring 230V 50Hz.
- Hot water tank thermostat.
- Room thermostat.
- System water valves.
- Circulating pump.
- External programmer.

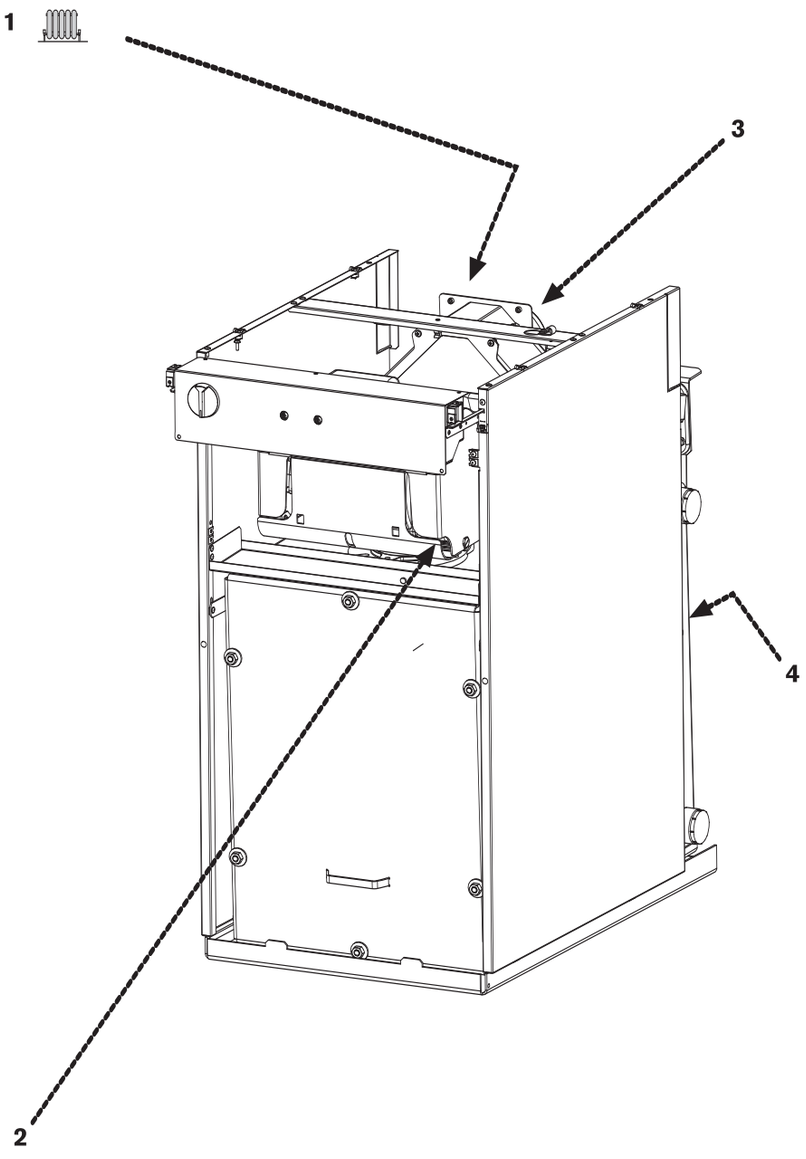
C - BOILER CONTROL BOX TERMINAL CONNECTOR BLOCK

Remote junction box (A) requirements:

- This must be a terminal block type, current rated to at least 5 amps.
- A 5 amp fuse must be fitted to the mains supply.
- The junction box (A) must be fitted externally to the boiler.

A frost thermostat can also be connected to the remote junction box if required.

PRE-COMMISSIONING CHECKS - APPLIANCE



CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

1 ▸ Check that the service and water pipes are connected correctly.

▸ Check that all unused sockets are capped.

2 ▸ Check that the oil supply is 28 sec kerosene and that the pipework is connected correctly to the oil pump via the supplied flexible oil hose.

▸ Turn on the main oil supply valve at the tank, check the oil supply pipework and connections. Rectify any leaks.

3 ▸ Check the flue is correctly fitted and the connections are secure.

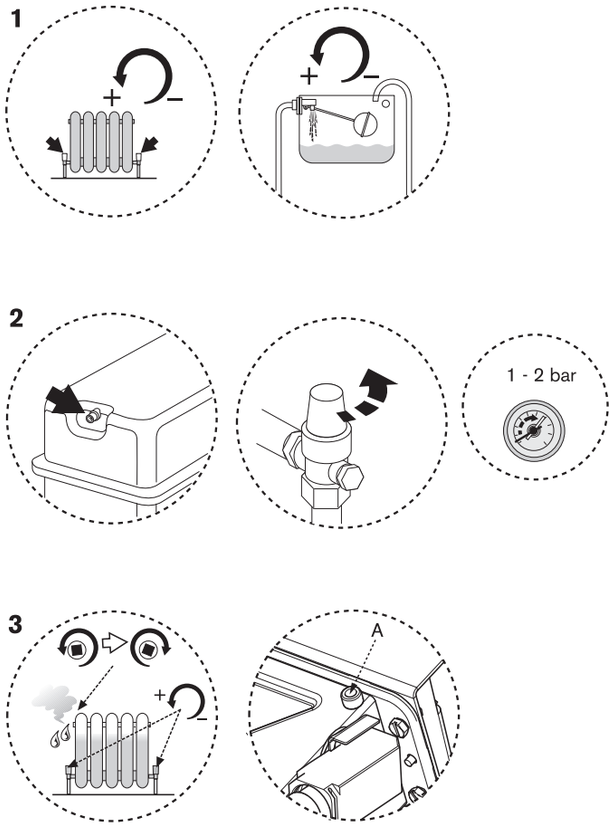
4 ▸ Check the condensate pipework is correctly fitted and connected.

▸ Check the condensate trap is filled with water.

IMPORTANT: If the boiler is not to be commissioned immediately then:

After successfully completing all of the checks and any rectification work, close the water valves, shut off the oil supply and electrically isolate the boiler.

Complete the installation part of the Guarantee Registration Card, and complete a CD10 or equivalent to inform the LABC of the installation.



FILLING THE SYSTEM

1 ▸ Open all system and radiator valves.

▸ Turn on the water main stop cock.

▸ **Open vented systems only:**

▸ Turn on the water to the system feed and expansion cistern and allow the system to fill.

2 ▸ **Sealed systems only:**

▸ Check and if required, adjust the expansion vessel pressure using the Schraeder type valve.

▸ Fill the system to between 1 and 2 bar pressure via a WRAS approved filling link.

▸ Monitor the pressure gauge during venting and repressurise if required.

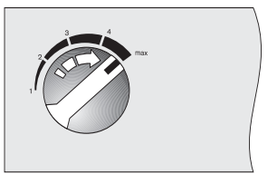
3 ▸ Vent all radiators, retighten when completed.

▸ Check the system and correct any leaks.

▸ Bleed air from at least one of the secondary heat exchanger air vents (a radiator key is ideal for this). There are two venting bosses (A) on the top of the secondary heat exchanger. Only one is used if fluing to the side.

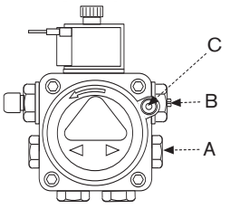
STARTING THE APPLIANCE

IMPORTANT: Never run the appliance when the appliance/system is unpressurised (sealed systems) or empty.

1 

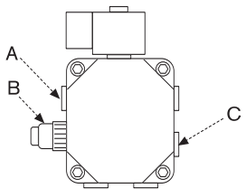
RIELLO

RDB OIL PUMP



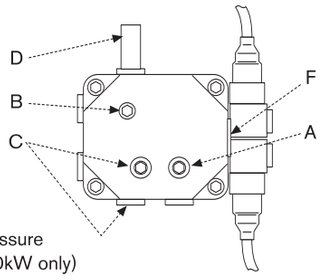
32/50kW

DANFOSS BFP 11 L3 OIL PUMP



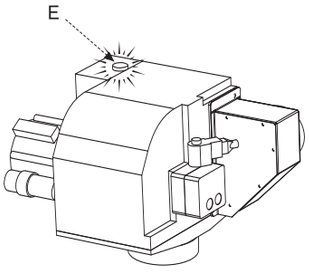
50/70kW

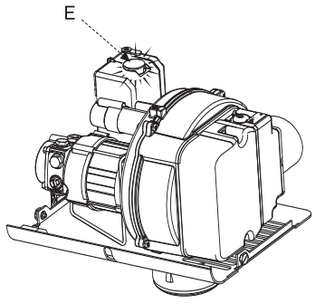
DANFOSS BFP 52E L3 OIL PUMP

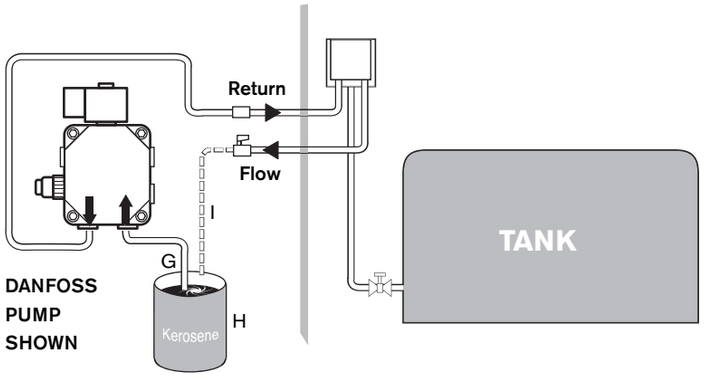


A - Bleed & pressure gauge port
B - Pressure adjustment
C - Vacuum gauge port
D - Second stage pressure adjustment (50/70kW only)
F - Oil filter

BURNER LOCKOUT/RESET







1 ▸ Check the oil supply is correctly fitted and in good working order before turning on the oil supply valves to the boiler.

▸ Turn on the main oil supply valve at the tank and draw off at least 2½ litres of oil until a steady flow of clear uncontaminated oil can be seen as follows:

- **The oil supply to the boiler should be primed before the burner is operated to avoid unnecessary pump wear.**
- **The use of an oil suction pump will prime and flush through any oil supply set up simply and easily, alternatively the following procedures can be used.**

▸ **Single pipe gravity feed systems:**

▸ Disconnect the flexible oil hose and open the isolating valve to discharge the oil into a suitable container.

NOTE: *Replace flexible hose at annual service to prevent possible oil leakage.*

▸ If a top entry tank has been used the pipework will need to be primed before the oil will discharge under gravity.

▸ When completed, close the isolating valve, reconnect the flexible oil hose.

▸ **Double pipe sub-gravity feed systems and single pipe suction lift with de-aerator:**

▸ To prime a de-aerator, disconnect the flexible oil inlet hose (G) from the isolation valve and place in a container of kerosene (H). Connect a spare flexible oil hose (I), to discharge into container (H). Open the isolating valve, turn on the power to the boiler and set the programmer to ON. Prime the de-aerator until there is a steady flow of oil into container (H). Turn off the boiler then reconnect the flexible oil inlet hose (G).

▸ Turn on the boiler, the oil level in the de-aerator will drop as the oil is used until the oil is drawn from the tank. If the de-aerator empties and the burner locks out before the oil is drawn from the tank, prime the de-aerator again.

When the oil reaches the pump, bleed the air from the pump as followes:

▸ Open the isolating valve and the oil pump bleed port (A) to discharge into a suitable container once the boiler is started up.

▸ Switch on the electricity supply to the boiler.

▸ Set the programmer to ON for CH and DHW.

▸ Turn on the boiler control thermostat.

▸ Allow the burner to run through to lockout indicated by the illumination of the lockout indicator/reset button (E).

If no oil comes out of the port valve A, then re-prime the oil line as detailed above.

▸ Wait 2 minutes then press the lockout reset button (E).

▸ Repeat the procedure until a steady stream of oil without air, runs from the bleed port, then relock bleed port (A).

▸ Switch off the boiler.

▸ Remove the oil pump filter, clean with kerosene and refit.

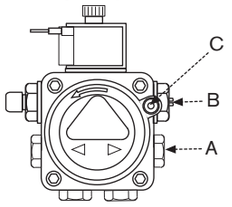
The internal filter is accessed by removing the oil pump cover on the Danfoss BFP 11 L3, Danfoss BFP 52E L3 and Riello RDB.

▸ Safely dispose of the container/discharge.

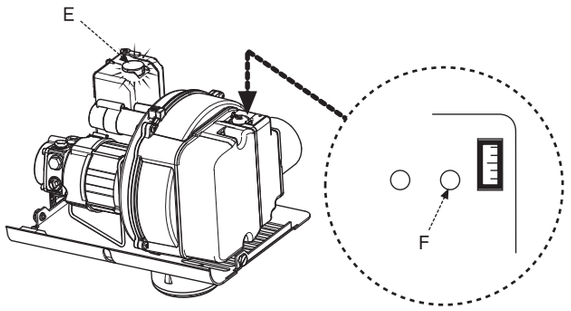
RIELLO RDB BURNERS

2

RIELLO
RDB OIL PUMP



A - Bleed & pressure gauge port
B - Pressure adjustment
C - Vacuum gauge port



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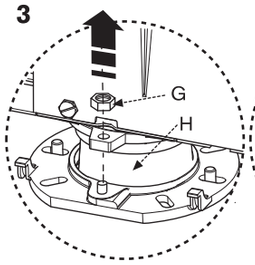

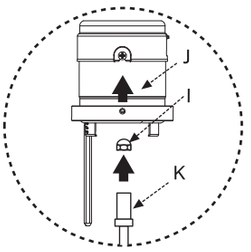

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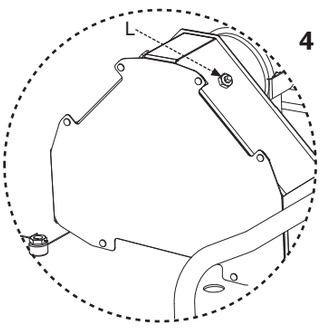

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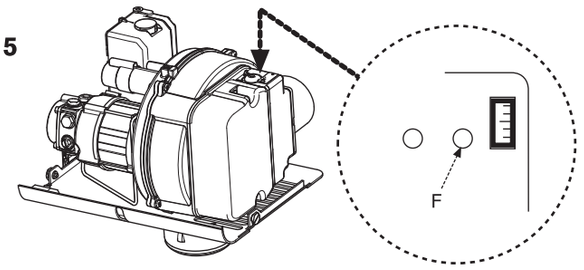


NOMINAL BOILER RATING AT NORMAL OPERATING TEMPERATURE USING 28sec KEROSENE:

NOZZLE	OIL PUMP PRESSURE (p.s.i.)	FUEL FLOW RATE		APPROX FLUE GAS TEMP. (°C)	%CO_2	APPROX. AIR SETTING	COMBUSTION HEAD SETTING	APPLIANCE			
								INPUT		OUTPUT	
		Kg/h	l/h					kW	Btu/hr	kW	Btu/hr
Riello RDB 3.2 (32/50):											
1.0 60°ES	100	2.78	3.52	75	11.5	3.0	3	33.4	114000	32	110000
1.10 60° S	130	3.55	4.49	77	12.0	4.5	4	42.7	146000	41	140000
1.35 60° S	135	4.33	5.48	85	12.5	5.5	5	52.1	178000	50	170000
Riello RDB 4.2 (50/70):											
1.25 60° S	145	4.33	5.48	80	12.0	2.5	1	52.1	178000	50	170000
1.50 45° S	145	5.2	6.58	80	12.0	5	2	62.5	213000	60	205000
2.00 45° S	125	6.05	7.66	86	12.0	4.5	3	72.9	249000	70	240000

2 ▸ Fit a suitable pressure gauge to port (A) on the oil pump.
▸ Adjust the air shutter (F) and pump pressure (B) as shown in the table below. The burner should ignite following a pre-ignition period of approx. 15 seconds.
▸ If changing the burner output, check the combustion head sttings as shown in the table below.

Boiler lockout indicator on:

If the burner fails to establish a normal firing pattern or flame failure occurs the flame monitoring photocell mounted in the burner body will alert the burner control box to shut the burner down and provide a safe lockout state indicated by the illumination of the lock-out indicator/reset button (E).

▸ Wait 2 minutes then press the lockout indicator reset button (E) to initiate another start sequence.
▸ Repeat procedure until a flame is established.

3 ▸ Start and run for 3 minutes then switch off.
▸ Check for after-spurting from the nozzle, indicated by oil saturation on the combustion head (G).

If after-spurting occurs:
▸ Release the burner retainer (H).
▸ Remove the burner from the boiler and the blast tube (J) from the burner to expose the nozzle. Hold the burner vertical to unscrew the nozzle (I) and fill the nozzle holder (K) with kerosene.
▸ Refit nozzle (I), blast tube (J) and the burner.
▸ Restart and run for 3 minute intervals until after-spurting stops.

4 ▸ Start and run for 20 minutes.
▸ Remove sampling point plug (L) to check the smoke reading is between 0-1. If the smoke level is above 1, check the combustion settings are correct and the oil nozzle is in good condition.

NOTE: *smoke readings may be inaccurate until the smoke from burning organic binder in the access door insulation has ceased.*

▸ Check the CO_2 levels and adjust the air shutter (F) setting according to the table opposite.
▸ Check the flue gas temperature is close to the values shown in the table.

If the flue gas temperature is too high and the baffles are correctly fitted, then reduce the oil pump pressure (B) 5-10p.s.i. to compensate for nozzle variations.

▸ Turn off the electrical supply.
▸ Isolate the oil supply to the burner.
▸ Remove the oil pressure gauge.
▸ Refit the blanking plug (A).
▸ Check and rectify any oil leaks.

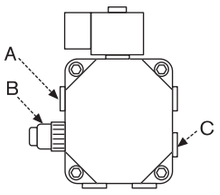
5 ▸ Switch on the oil supply.
▸ Switch on the electrical supply.
▸ Restart the boiler and run for 5 minutes.
▸ Recheck the CO_2 levels and if required, adjust the air shutter setting (F) to obtain the correct CO_2 level.
▸ Repeat the fine tuning procedure (5) if required.
▸ Refit the sample point cap (L) (hand tighten only, do not over tighten).

STARTING THE APPLIANCE

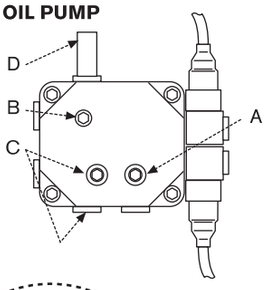
BENTONE STIRLING BURNERS

2

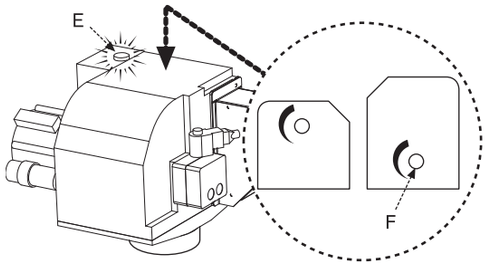
32/50kW
DANFOSS BFP 11 L3
OIL PUMP



50/70kW
DANFOSS BFP 52E L3
OIL PUMP



A - Bleed & pressure gauge port
B - Pressure adjustment
C - Vacuum gauge port
D - Second stage pressure adjustment



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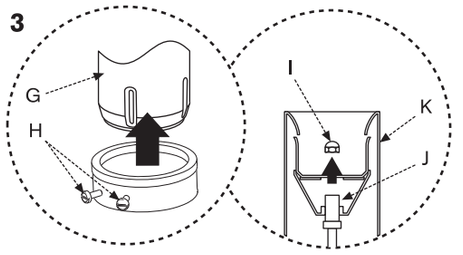

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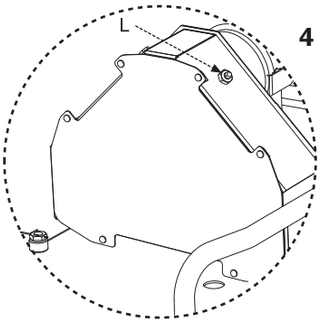

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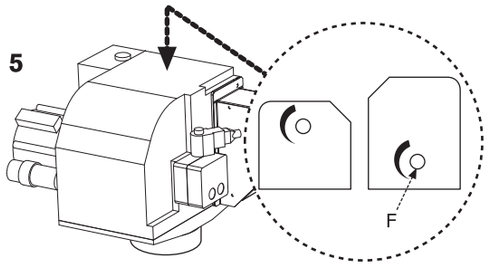


NOMINAL BOILER RATING AT NORMAL OPERATING TEMPERATURE USING 28sec KEROSENE:

NOZZLE	OIL PUMP PRESSURE (p.s.i.)	FUEL FLOW RATE		APPROX FLUE GAS TEMP. (°C)	%CO_2	APPROX. AIR SETTING	COMBUSTION HEAD SETTING	APPLIANCE			
								INPUT		OUTPUT	
		Kg/h	l/h					kW	Btu/hr	kW	Btu/hr
Bentone Sterling 133 Burner (32/50kW):											
0.85 60°ES	150/-	2.78	3.52	75	11.5	2.0	N/A	33.4	114000	32	110000
1.10 45° S	120/-	3.55	4.49	85	12.0	4.0	N/A	42.7	146000	41	140000
1.35 45° S	155/-	4.33	5.48	95	12.5	8.0	N/A	52.1	178000	50	170000
Bentone Sterling 146 Burner (50/70kW):											
1.25 45° S	145/150	4.33	5.48	80	12.0	6.0	N/A	52.1	178000	50	170000
1.50 45° S	145/150	5.2	6.58	85	12.0	9.0	N/A	62.5	213000	60	205000
2.00 45° S	110/135	6.05	7.66	90	12.0	13.0	N/A	72.9	249000	70	240000

2 ▸ Fit a suitable pressure gauge to port (A) on the oil pump.
▸ Adjust the air shutter (F) and pump pressure (B) as shown in the table below. The burner should ignite following a pre-ignition period of approx. 15 seconds.

Boiler lockout indicator on:

If the burner fails to establish a normal firing pattern or flame failure occurs the flame monitoring photocell mounted in the burner body will alert the burner control box to shut the burner down and provide a safe lockout state indicated by the illumination of the lock-out indicator/reset button (E).

▸ Wait 2 minutes then press the lockout indicator reset button (E) to initiate another start sequence.
▸ Repeat procedure until a flame is established.

3 ▸ Start and run for 3 minutes then switch off.
▸ Check for after-spurting from the nozzle, indicated by oil saturation on the combustion head (G).

If after-spurting occurs:
▸ Release the burner retainers (H).
▸ Remove the burner, combustion head (G). and electrodes, hold the burner vertical to unscrew the nozzle (K) and fill the nozzle holder (J) with kerosene.
▸ Refit nozzle (K), electrodes, combustion head (G) and the burner.
▸ Restart and run for 3 minute intervals until after-spurting stops.

4 ▸ Start and run for 20 minutes.
▸ Remove sampling point plug (L) to check the smoke reading is between 0-1. If the smoke level is above 1, check the combustion settings are correct and the oil nozzle is in good condition.

NOTE: *smoke readings may be inaccurate until the smoke from burning organic binder in the access door insulation has ceased.*

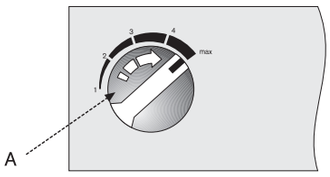
▸ Check the CO_2 levels and adjust the air shutter (F) setting according to the table opposite.
▸ Check the flue gas temperature is close to the values shown in the table.

If the flue gas temperature is too high and the baffles are correctly fitted, then reduce the oil pump pressure (B) 5-10p.s.i. to compensate for nozzle variations.

▸ Turn off the electrical supply.
▸ Isolate the oil supply to the burner.
▸ Remove the oil pressure gauge.
▸ Refit the blanking plug (A).
▸ Check and rectify any oil leaks.

5 ▸ Switch on the oil supply.
▸ Switch on the electrical supply.
▸ Restart the boiler and run for 5 minutes.
▸ Recheck the CO_2 levels and if required, adjust the air shutter setting (F) to obtain the correct CO_2 level.
▸ Repeat the fine tuning procedure (5) if required.
▸ Refit the sample point cap (L) (hand tighten only, do not over tighten).

1



Central heating:

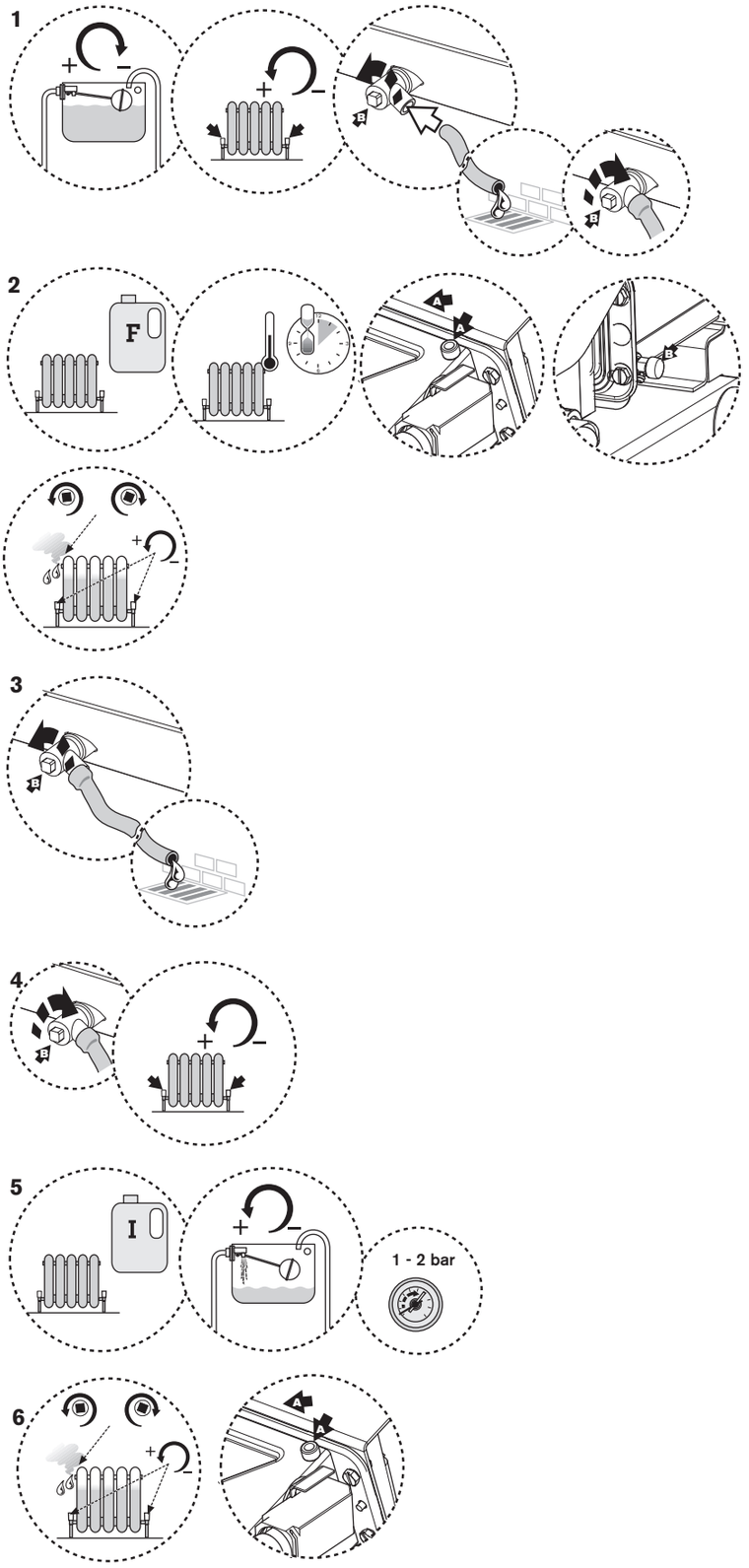
1 ▸ Open all radiator valves.
▸ Set room thermostat to maximum.
▸ Set programmer to ON for CH & DHW (if applicable).
▸ Turn the boiler control thermostat (A) to max.

The burner should be ON with the circulating pump.

▸ Ensure all radiators are heating up evenly and balance the system to the temperature difference required for the heating flow and return according to the heating load.

2 ▸ Set the room thermostat to minimum.
The burner and circulating pump should be off.

3 ▸ Check that any other controls that are fitted to the system are operating properly.



WATER TREATMENT

IMPORTANT: Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance warranty.

FLUSHING (Central Heating):

1 ▸ Switch off the boiler.
- ▸ Open vented systems only: turn off the water to the system header tank.
- ▸ Open all radiator valves/drain cocks (B) and drain the system while the appliance is hot.
- ▸ Close drain cocks (B).

2 ▸ Add a suitable flushing agent (F) and refill the system at the correct strength for the system condition in accordance with the manufacturer's instructions.
- ▸ Vent the boiler (there are two vent points (A) at the top of the secondary heat exchanger. Only one may be in use, the other may be obscured by side fluing. Always vent (A) and all radiators.
- ▸ Run the boiler/system at normal operating temperature for the time stated by the flushing agent manufacturer.

3 ▸ Drain and thoroughly flush the system to remove the flushing agent and debris.

INHIBITOR (Central Heating):

4 ▸ Check drain cocks and manual air vents are closed and all radiator valves are open.

5 ▸ Add a suitable inhibitor, (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system in accordance with the manufacturers instructions.

The inhibitor or combined inhibitor/anti-freeze must not cause damage to the materials within the boiler (mild steel, stainless steel, copper and brass) and any other materials/components within the system.

- ▸ Open vented systems only: turn on the water to the system header tank and allow the system to fill.
- ▸ Sealed systems only: fill the system to between 1 and 2 bar via a WRAS approved filling loop. Check the system pressure during venting and repressurise if necessary.

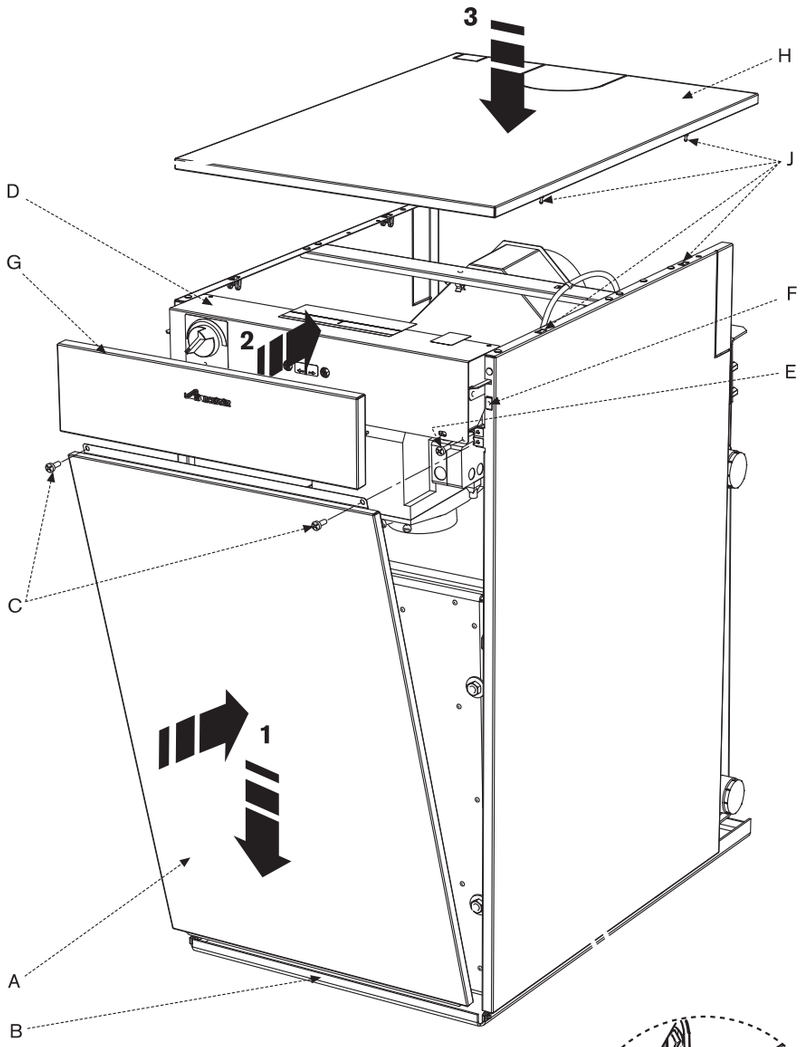
6 ▸ Vent the boiler (there are two vent points (A) at the top of the secondary heat exchanger. Only one may be in use, the other maybe obscured by side fluing. Always vent (A) and all radiators; retighten vents when complete.

7 ▸ Record the date when the inhibitor was added to the system on the guarantee card.

NOTE: *The concentration level of inhibitor in the system should be checked every 12 months or sooner if system content is lost.*

The addition of sealing agents to the system water is not advised as this can cause problems with deposits left in the heat exchanger and invalidate the appliance and heat exchanger warranty .

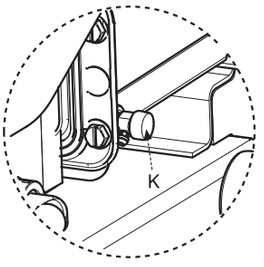
FINISHING COMMISSIONING - APPLIANCE



1 ▸ Locate edge of front panel (A) onto the supporting ledge (B) on the baseplate.
▸ Refit securing screws (C) to secure.

2 ▸ Slide control box (D) into boiler.
▸ Secure with screws (E).
▸ Locate the ball stud connectors (F) and push-fit upper front panel (G) towards the boiler to secure.

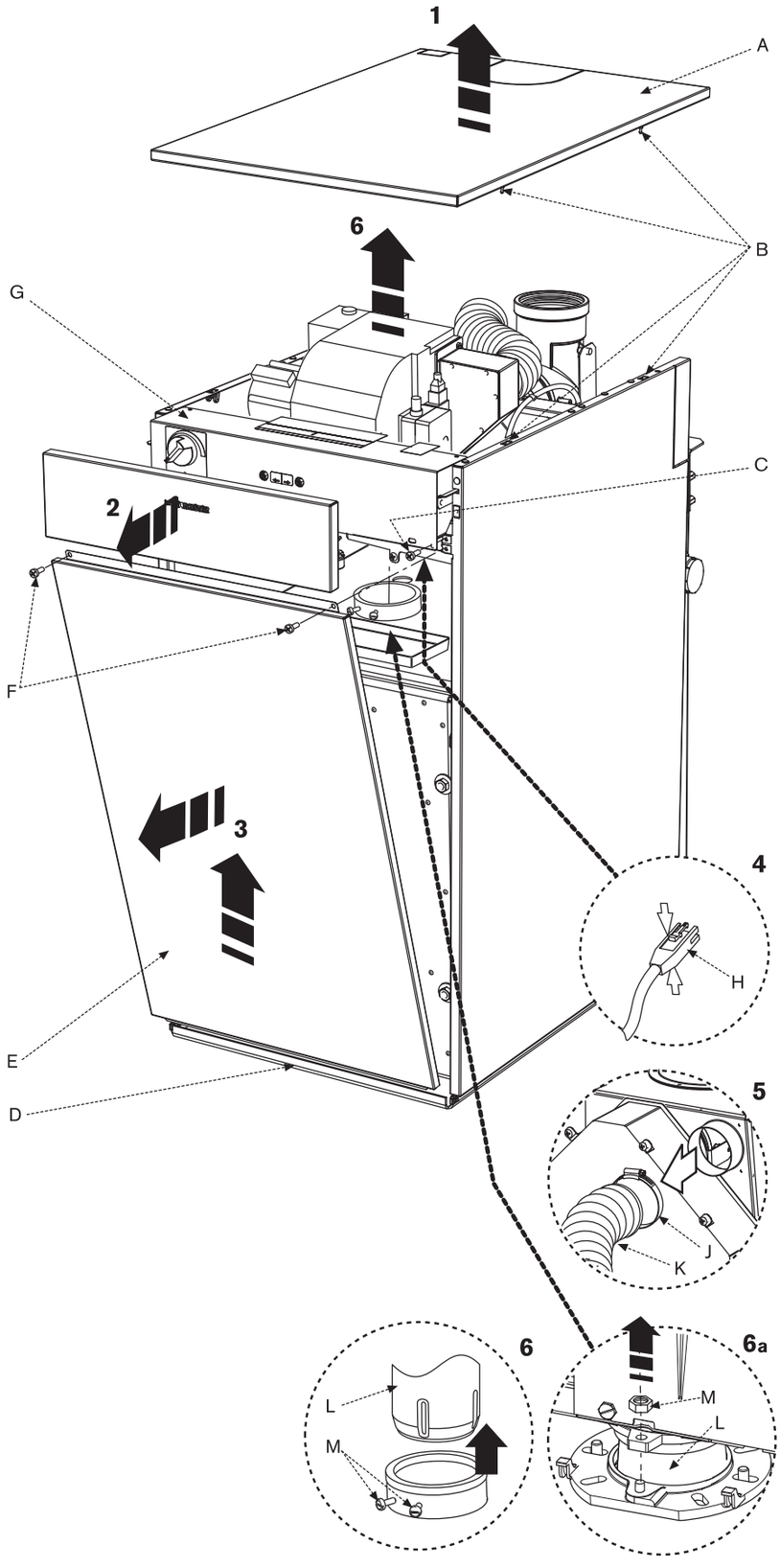
3 ▸ Locate the top panel (H) onto the ball stud connections (J) and press down to secure. **Always apply pressure at the edges of the boiler panels when securing to avoid accidental damage.**



Handover:

- Complete the Guarantee Registration Card, Combustion Record (at the rear of this manual) and CD11 or an equivalent commissioning form.
- Set up the controls and show the user how to operate all the controls shown in the User Guide and all system controls.
- Where applicable, instruct the customer how to repressurise the system.
- If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies, isolate the boiler and drain the system and boiler including the secondary heat exchanger.

NOTE: *Release drain point (K) to drain the secondary heat exchanger.*



CAUTION: ISOLATE THE WATER, ELECTRICITY AND OIL MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

Routine servicing:

To maintain efficient boiler operation, the following should be carried out at least once a year:

- Carry out a pre-service check and note any operational faults:

- **Pre-Service Check:**

1 - Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove.

2 - Pull upper front panel squarely forwards to disengage ball stud connections and remove from control box (G).
- Remove securing screws (C) from each side.
- Slide control box (G) outwards to its full extent.

3 - Remove securing screws (F) from front panel (E).
- Lift panel (E) up and away from the supporting ledge (D) on the boiler.

Operate the appliance and system and note any faults which may need to be corrected during the service.

- Switch off and electrically isolate the boiler.

4 - Depress locking ears and unplug burner lead (H) from control box (G).

5 - RS flue only: loosen clip (J) to detach air duct (K) from the air intake box.

6 - **Sterling burner:**
- Release burner retainers (M).
- Lift burner up to release blast tube (L) from heat exchanger, taking care not to over strain the flexible oil hose/s or connections, and store safely away from the boiler.

6a - **Riello burner:**
- Remove burner retainer nut (M).
- Lift burner up to release blast tube (L) from heat exchanger, taking care not to over strain the flexible oil hose/s or connections, and store safely away from the boiler.

See the following instructions for detail of some of the service requirements listed below:

- Check and clean the burner.
- Replace burner nozzle and flexible oil hose/s.
- Check and clean the baffle retainers.
- Check and clean the baffles.
- Check and clean the heat exchangers surfaces.
- Check the combustion chamber access door insulation board.
- Check that the flue system is unobstructed and clean as necessary.
- Clean or replace all oil filters.
- Check that the condensate system is not obstructed, clean and refill the condensate trap as necessary.

32/50kW

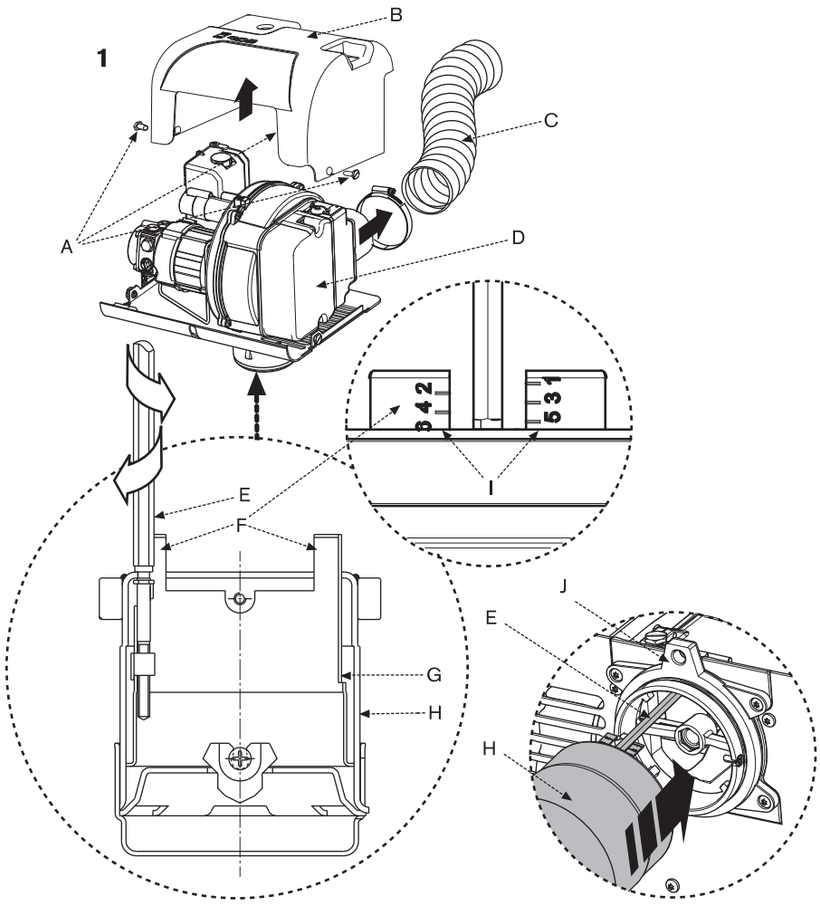
RIELLO RDB 3.2 BURNER SETTINGS

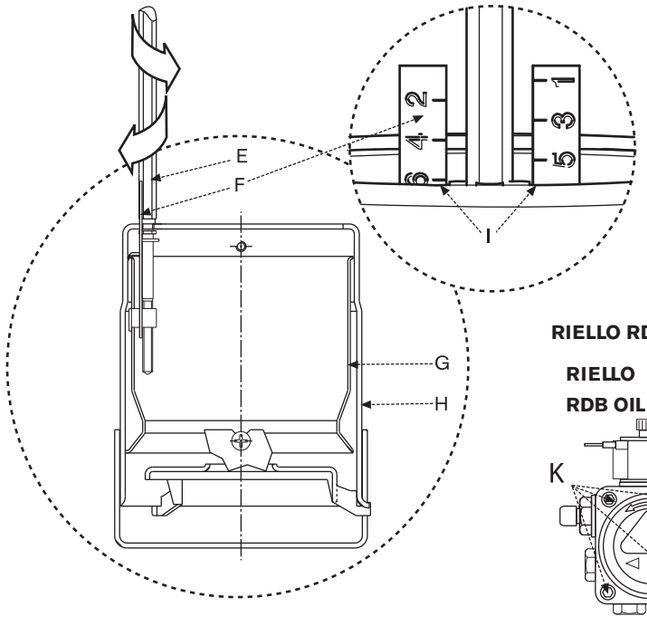
Output	Combustion head setting (F)
kW	Set at top of Combustion head (I)
32	3
41	4
50	5

50/70kW

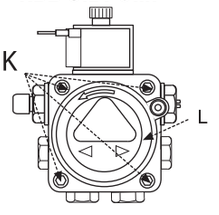
RIELLO RDB 4.2 BURNER SETTINGS

Output	Combustion head setting (F)
kW	Set at top of Combustion head (I)
50	1
60	2
70	3





RIELLO RDB OIL PUMP



1 Clean the Burner:

- Undo the three screws (A) and remove cover (B) from the burner.
- Loosen clip to remove the flexible air inlet hose (C) from the burner (RS flue systems only).
- Remove the air intake cover (D) by releasing the M4 screws.
- Check the condition of the gasket between these two parts and replace if necessary.
- Note the position of the air damper adjustment and check the air damper moves freely.
- Clean both sides of the fan impeller and remove any debris from the burner housing.
- Check the impeller rotates freely.
- Reassemble components.
- Remove the combustion head from the burner by removing the two opposing screws at the top of the combustion head.
- Check that the combustion head setting (F) is correct for the relevant output as shown in the table opposite.
- To adjust the combustion head setting (F), turn the adjustment bar (E) clockwise or anti-clockwise to move the inner sleeve (G) up and down the blast tube (H). The correct setting is shown when the relevant number on the scale (F) is in line with the top of the blast tube (I).
- The electrodes and nozzle are factory set and there is no need to adjust them.

DO NOT dismantle the nozzle and DO NOT clean the nozzle tip.

- With the adjustment bar (E) in line with the top of the burner (J) return the combustion head and secure in place with the two screws at the top of the blast tube.
- Withdraw the photocell from its housing and wipe clean.
- Remove the oil pump internal filter, clean in kerosene and reassemble.
  The internal filter is accessed by removing screws (K) and the oil pump cover (L)

IMPORTANT

- **Replace the standard flexible oil hose/s at every annual service to prevent the possibility of oil leakage.**

External oil filter:

- Remove the paper element from the external oil filter and replace it. If the filter contains a washable element, thoroughly clean in kerosene and reassemble into the filter.

32/50kW

STERLING 133 BURNER SETTINGS:

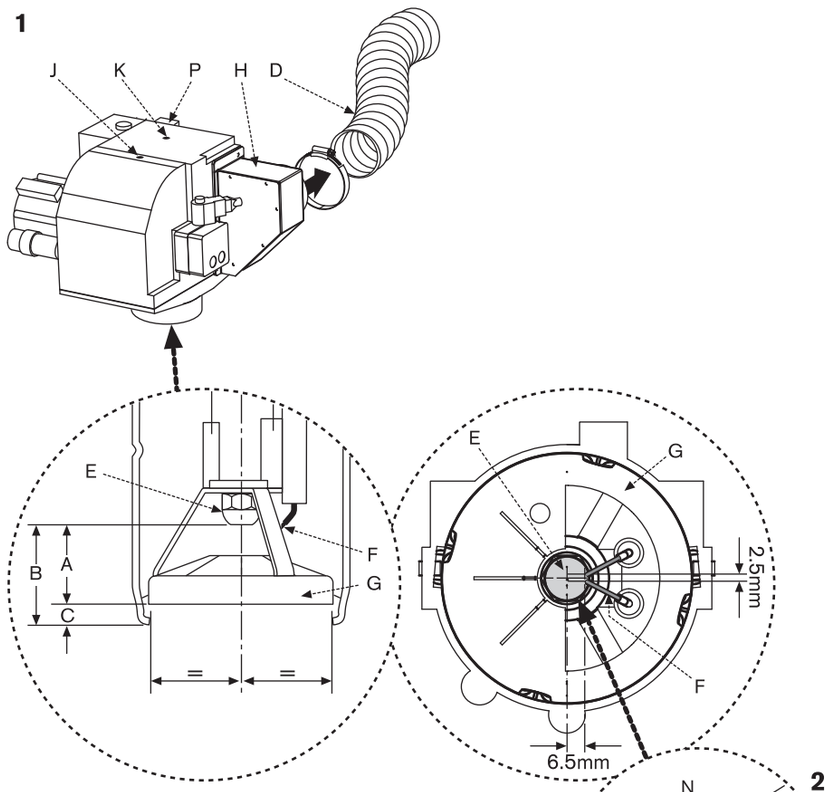
Output	Dimensions (mm)		
kW	A	B	C
32	22	26	4
41	29	34	5
50	29	35	6

50/70kW

STERLING 146 BURNER SETTINGS:

Output	Dimensions (mm)		
kW	A	B	C
50	27	35	8
60	33	41	8
70	33	46	13

1

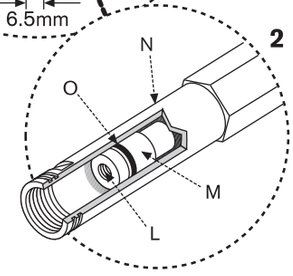


A - Nozzle to front of break plate

B - Nozzle to front of blast tube

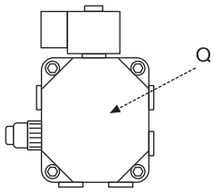
C - Front of break plate to front of blast tube

2



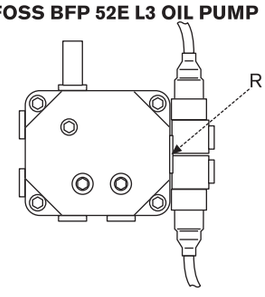
32/50kW

DANFOSS BFP 11 L3 OIL PUMP



50/70kW

DANFOSS BFP 52E L3 OIL PUMP



INSPECTION AND SERVICE

1 Clean the Burner:

- Loosen clip to remove the flexible air inlet hose (D) from the burner (RS flue systems only).
- Remove the air intake cover (H) by releasing the M4 screws.
- Seperate the main body of the burner from the front by removing the M5 screw (J), located beneath the air adjustment screw (K), using a 4mm allen key.
- Check the condition of the gasket between these two parts and replace if necessary.
- Note the position of the air damper adjustment and check the air damper moves freely.
- Clean both sides ofthe fan impeller and remove any debris from the burner housing.
- Check the impeller rotates freely.
- Reassemble components.

2 Inspection of Mechanical Shut-off Valve:

- Remove the nozzle (E).
- Fasten an M5 screw, with a minimum length of 30mm, into the threaded hole (L) and pull the screw to withdraw the check valve (M).
- Check that the nozzle holder (N) is clear of any debris and clean if necessary.
- Check that the three holes in the check valve (M) are clear of any debris. Check the condition of the 'O' ring (O). Discard the check valve if the holes cannot be cleared, if the unit is defective or if the 'O' ring is damaged and replace with a new one.
- Refit the check valve.
- Remove the combustion head and thoroughly clean any deposits.
- Fit a new oil atomising nozzle (E).

DO NOT dismantle the nozzle and DO NOT clean the nozzle tip.

- Check the electrodes (F) and reset if necessary as shown opposite. The electrode assembly must be positioned at 3 o'clock as shown.
- Refit the combustion head. Check that the nozzle (E) lies centrally in the combustion head and the head settings are as shown. Ensure that the photo cell is lined up with the sight hole.
- Withdraw the photocell (P) from its housing and wipe clean.
- Remove the oil pump internal filter, clean in kerosene and reassemble.

Danfoss BFP 11 L3 internal filter is accessed by removing the oil pump cover (Q).
Danfoss BFP52E L3 internal filter is accessed by unscrewing and withdrawing cartridge (R).

IMPORTANT

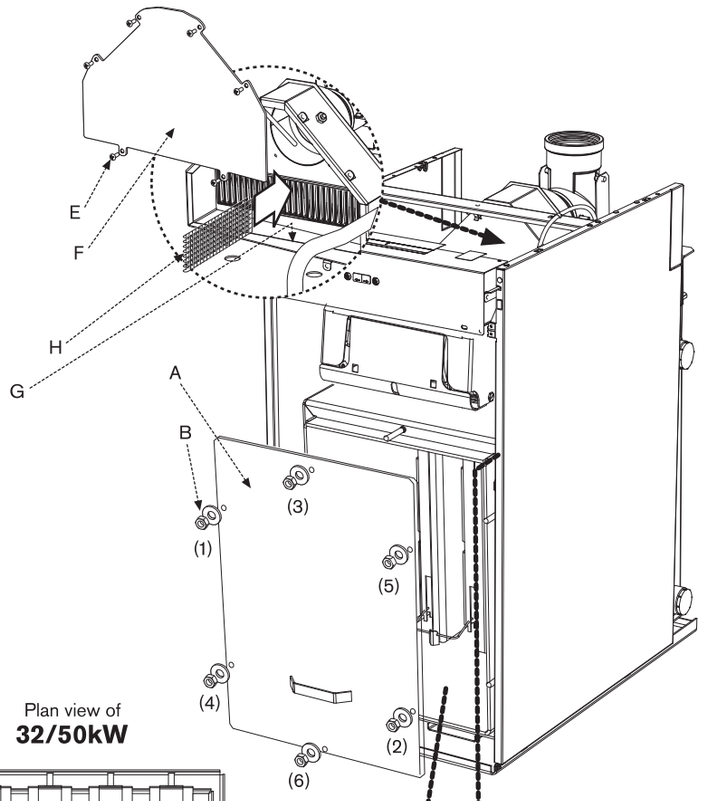
- **Replace the standard flexible oil hose/s at every annual service to prevent the possibility of oil leakage.**

- Reassemble the burner components.
- Check the sponge O-ring seal located around the combustion head and replace if necessary.
  This seal must be in good condition since failure will cause flue gases to escape into the room.

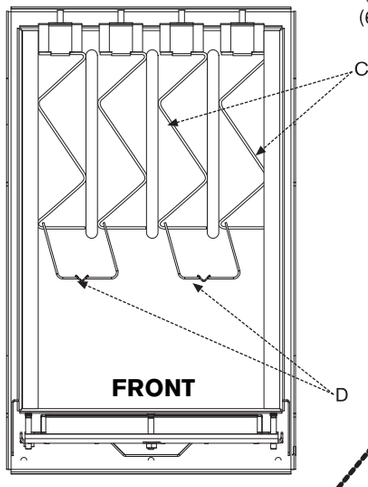
External oil filter:

- Remove the paper element from the external oil filter and replace it. If the filter contains a washable element, thoroughly clean in kerosene and reassemble into the filter.

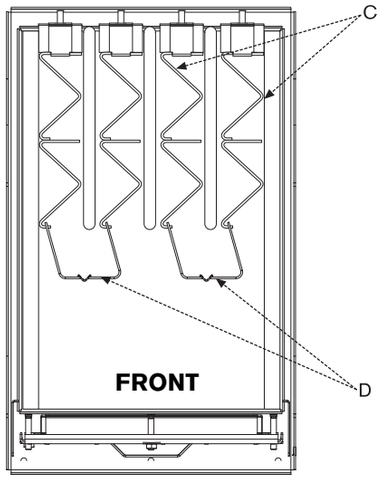
SERVICING & SPARES

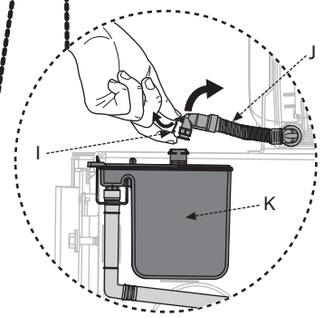


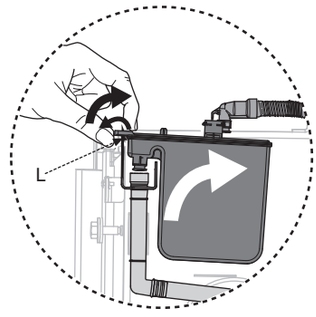
Plan view of
32/50kW

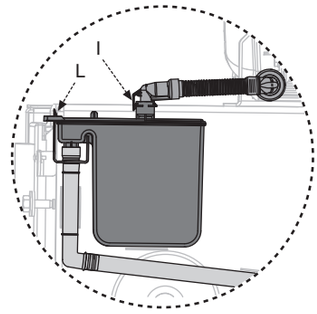


Plan view of
50/70kW









SERVICING & SPARES

INSPECTION AND SERVICE

Clean the boiler:

Manifold access:

- Release screws (E) to remove the flue manifold access cover (F) and clear any debris.
- Check the flue system and clean if necessary.
- Remove the baffle retainer and baffles (H) from the secondary heat exchanger.

	SLOTS	DOUBLE BAFFLES	SINGLE BAFFLES
32/50kW*	25	10	N/A
50/70kW	31	15	1

**Five of the slots do not have baffles.*

- Check and clean the secondary heat exchanger surfaces.

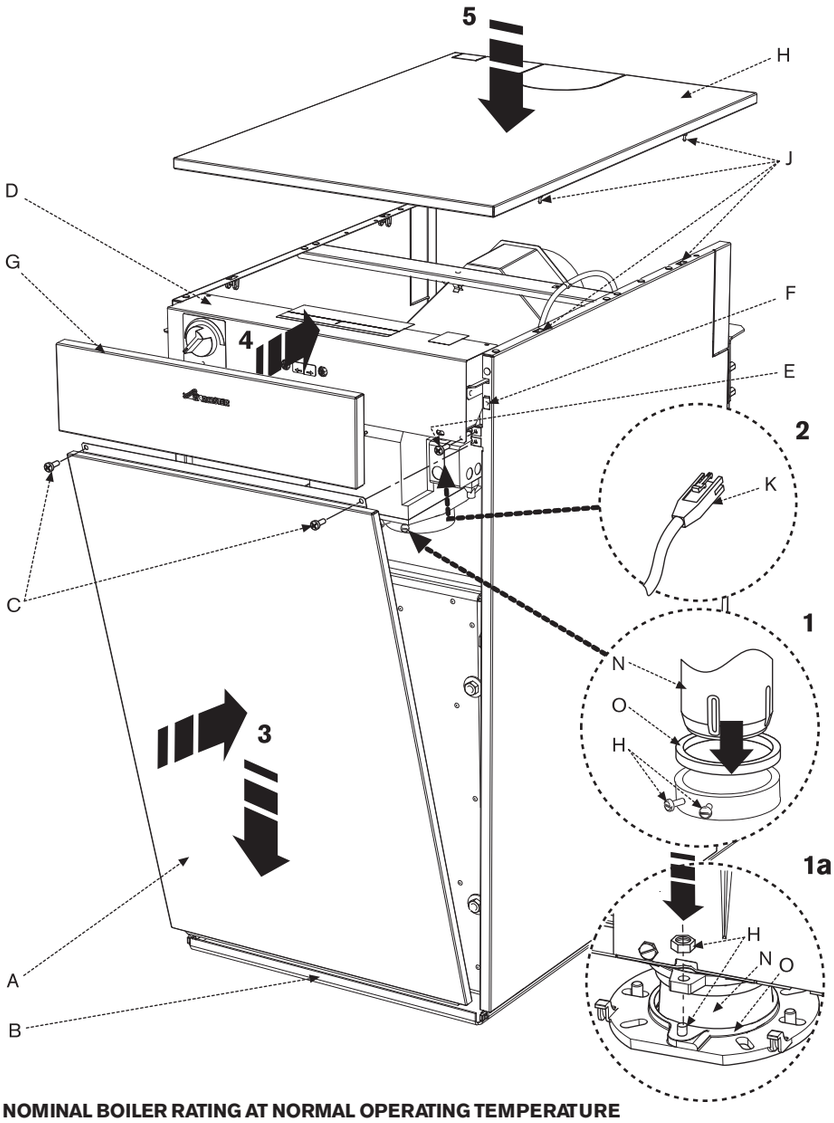
NOTE: *Do not use wire brushes and cleaning agents to clean the stainless steel secondary heat exchanger components.*

- Check the condensate route (G) is clear.
- The condensate trap (K) should be removed and checked for debris.
- Release the pipe locking tab (I) and disconnect the flexible pipe (J) from the top of the trap and move the flexible pipe up away from the trap
- Release the trap locking tab (L) and move the trap up and back to remove from its mountings.
- Clean the trap by flushing with water.
- Check the O ring seals and replace if necessary, grease the seals with a solvent free grease.
- Refit the trap making sure that the locking tabs are locked in place.
- Pour 500ml of water into drain (G) to refill the condensate trap.
- Clean the secondary heat exchanger baffles (H) if necessary and refit correctly.
- Refit the baffle retainer.
- Check the seal on the manifold access cover (F) and replace if necessary.
- Refit the flue manifold access cover (F) and secure with screws (E).

Combustion chamber:

- Release the M10 retaining nuts and washers (B) and remove combustion chamber access door (A).
- Check the fibreglass rope seal on the combustion chamber access door (A) and replace if necessary.
- Remove and check the baffle retainers (D).
- Remove the baffles (C), clean and check the condition of the baffles and the acoustic insulation. Replace any baffles or insulation pads considered to be badly corroded/degraded.
- Thoroughly clean all of the heat exchanger surfaces using a suitable brush and clear all loose debris from the combustion chamber.
- Check the condition of the combustion chamber access door insulation. If the insulation is damaged the door assembly must be replaced.
- Refit the items in reverse order ensure the baffles (M) and baffle retainers (L) are correctly fitted for the boiler output as shown in the plan view opposite.
- Refit combustion chamber door (K).

IMPORTANT: Secure with nuts and washers (B) and tighten, using the sequence shown, until the chamber door is firmly secured, do not over tighten the nuts.



INSPECTION AND SERVICE

Fire valve:

- Check that the oil supply pipe has a fire valve fitted externally to the building with the fire valve sensor located within the appliance case. A fire valve sensor clip is provided for this purpose on the casing support panel.

Re-commission the burner:

1 **Sterling burner:**
Align burner combustion head (N) into boiler housing tube with gasket (O) correctly fitted.
- Push firmly down to compress the gasket (O).
- Tighten burner retainers (H) sufficiently to ensure a good seal.

1a **Riello burner:**
Align burner combustion head (N) into boiler housing tube flange (O).
- Secure with retaining nut (H).
- Tighten retaining nut sufficiently to ensure a good seal.

IMPORTANT:
Ensure the gasket is a good seal between the burner combustion head and the boiler housing to prevent flue gases escaping from the combustion chamber into the room.

2 Plug burner lead (K) into control box (D).
- Connect an oil pressure gauge to the oil pump, run the burner and check the oil pressure is correct for the required boiler output. Check that the smoke reading is between 0 and 1, if the smoke reading is above 1 check the air setting. If the air setting is correct check that the burner has been reassembled correctly.
Allow the boiler to warm up then check the combustion settings are correct as indicated in the table below, adjust the CO_2 if necessary using the air shutter.
When the combustion is correct turn off the boiler, remove the pressure gauge and refit the blanking plug.

Refit panels:

3 Locate edge of front panel (A) onto supporting ledge (B) on the baseplate.
- Secure with screws (C).

4 Slide control box (D) into the boiler.
- Secure with screws (E).
- Locate ball stud connectore (F) and push-fit upper front panel (G) towards the boiler to secure.
- If the data label plate has been removed ensure it is refitted to the appliance.

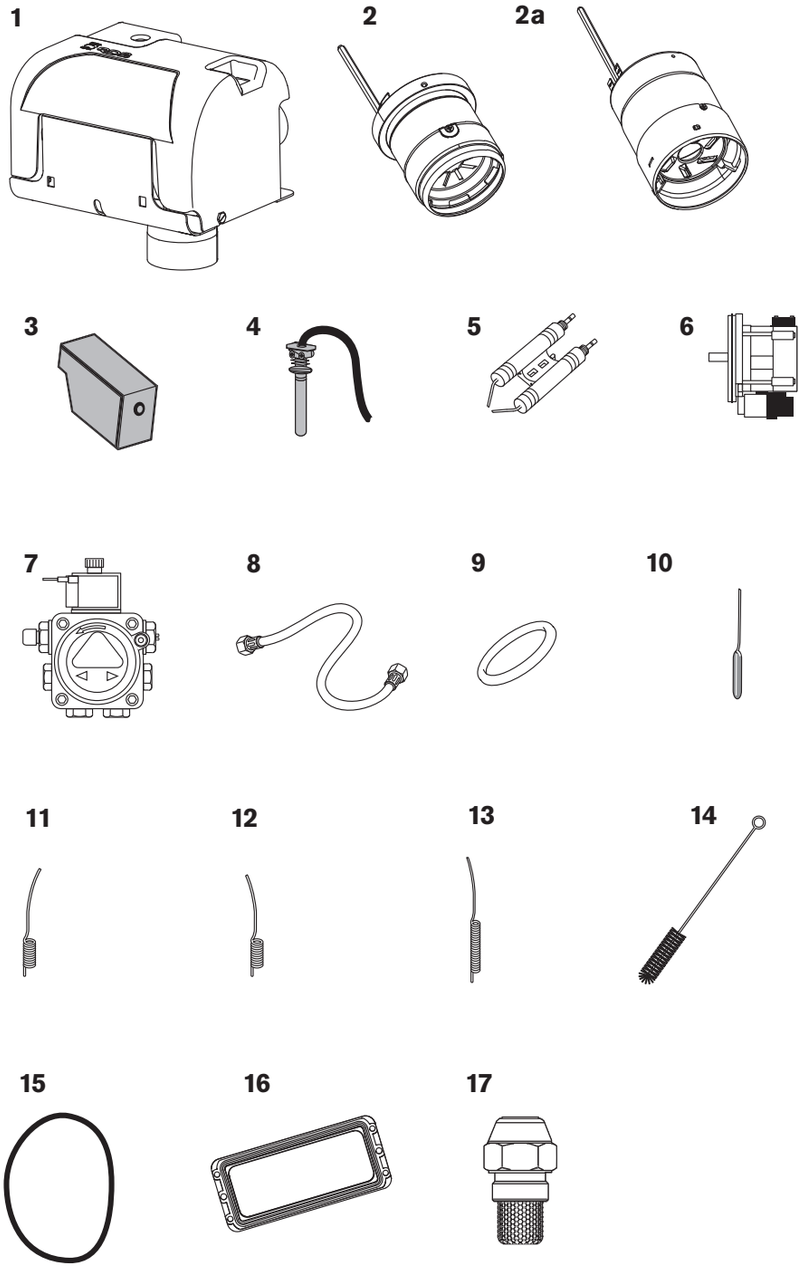
5 Locate the top panel (H) onto the ball stud connections (J) and press down to secure.

After service handover:

- Make a note of the date of any water treatment.
- Set the controls back to the users requirements.
- Complete the service interval record at the back of this manual and a CD11 or an equivalent form.
- If the appliance is unused and exposed to freezing conditions; shut off all the mains supplies, isolate the boiler and drain the system and boiler, including the secondary heat exchanger.

NOMINAL BOILER RATING AT NORMAL OPERATING TEMPERATURE USING 28sec KEROSENE:

NOZZLE	OIL PUMP PRESSURE (p.s.i.)	FUEL FLOW RATE		APPROX FLUE GAS TEMP. (°C)	%CO_2	APPROX. AIR SETTING	COMBUSTION HEAD SETTING	APPLIANCE INPUT		APPLIANCE OUTPUT	
		Kg/h	l/h					kW	Btu/hr	kW	Btu/hr
Bentone Sterling 133 Burner (32/50kW):											
0.85 60°ES	150/-	2.78	3.52	75	11.5	2.0	N/A	33.4	114000	32	110000
1.10 45° S	120/-	3.55	4.49	85	12.0	4.0	N/A	42.7	146000	41	140000
1.25 45° S	155/-	4.33	5.48	95	12.5	8.0	N/A	52.1	178000	50	170000
Bentone Sterling 146 Burner (50/70kW):											
1.25 45° S	145/150	4.33	5.48	80	12.0	6.0	N/A	52.1	178000	50	170000
1.50 45° S	145/150	5.2	6.58	85	12.0	9.0	N/A	62.5	213000	60	205000
2.00 45° S	110/135	6.05	7.66	90	12.0	13.0	N/A	72.9	249000	70	240000
Riello RDB 3.2 (32/50):											
1.0 60°ES	100	2.78	3.52	75	11.5	3.0	3	33.4	114000	32	110000
1.10 60° S	130	3.55	4.49	77	12.0	4.5	4	42.7	146000	41	140000
1.35 60° S	135	4.33	5.48	85	12.5	5.5	5	52.1	178000	50	170000
Riello RDB 4.2 (50/70):											
1.25 60° S	145	4.33	5.48	80	12.0	2.5	1	52.1	178000	50	170000
1.50 45° S	145	5.2	6.58	80	12.0	5	2	62.5	213000	60	205000
2.00 45° S	125	6.05	7.66	86	12.0	4.5	3	72.9	249000	70	240000



RIELLO RDB BURNERS

SHORT PARTS LIST

1 Burner - Riello RDB 3.2 32/50
Part Number: 8 718 686 583 0
Burner - Riello RDB 4.2 50/70
Part Number: 8 718 686 726 0
2 Combustion head - ELICA G3 32/50
Part Number: 8 716 116 102 0
2a Combustion head - ELICA G10 50/70
Part Number: 8 716 116 105 0
3 Control box 535 RSE/LD
Part Number: 8 716 109 230 0
4 Photocell
Part Number: 8 716 109 193 0
5 Ignition electrode
Part Number: 8 716 109 183 0
6 Motor
Part Number: 8 718 687 343 0
7 Oil pump - Riello RDB
Part Number: 8 716 109 182 0
8 Flexible oil hose kit
Part Number: 8 716 116 103 0
9 Burner 'O' ring gasket
Part Number: 8 718 687 347 0
10 Heating control thermostat
Part Number: 8 716 107 621 0
11 Auto reset High Limit thermostat
Part Number: 8 716 107 798 0
12 Manual reset High Limit thermostat
Part Number: 8 716 107 621 0
13 Manual reset flue thermostat
Part Number: 8 716 107 624 0
14 Cleaning brush
Part Number: 8 716 109 428 0
15 Gasket manifold 32/50
Part Number: 8 718 680 315 0
Gasket manifold 50/70
Part Number: 8 718 680 344 0
16 Secondary Heat Exchanger gasket 32/50
Part Number: 7 747 009 829 0
Secondary Heat Exchanger gasket 50/70
Part Number: 8 718 680 093 0

17 Oil nozzle 32/50
1.0 60° ES (32kW output)
Part Number: 8 716 156 675 0

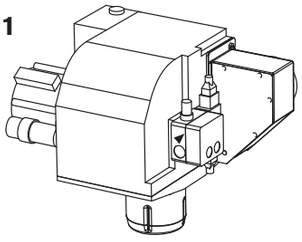
1.10 60° S (41kW output)
Part Number: 8 716 142 795 0

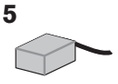
1.35 45° S (50kW output)
Part Number: 8 716 142 796 0

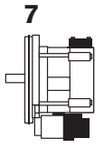
Oil nozzle 50/70
1.25 60° S (50kW output)
Part Number: 8 716 156 511 0

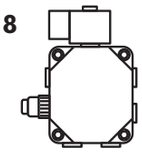
1.50 45° S (60kW output)
Part Number: 8 716 108 098 0

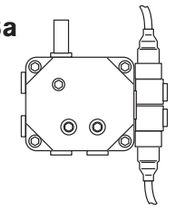
2.00 45° S (70kW output)
Part Number: 8 716 110 047 0

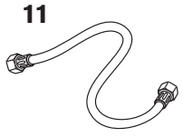


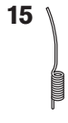


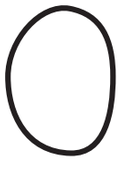


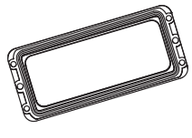


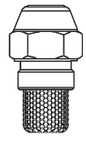












BENTONE STERLING BURNERS

SHORT PARTS LIST

1 Burner - Sterling 133 32/50
Part Number: 8 716 108 063 0
Burner - Sterling 146 50/70
Part Number: 8 716 108 065 0
2 Combustion head - Type S 32/50
Part Number: 8 716 108 079 0
Combustion head - Type S 50/70
Part Number: 8 716 108 079 0
3 Control box Satronic TF 832.3
Part Number: 8 716 156 648 0
4 Photocell Satronic MZ770s
Part Number: 8 716 156 692 0
5 Control box base Satronic S98 12 pole
Part Number: 8 716 142 782 0
6 Ignition electrode A 21 32/50
Part Number: 8 716 108 082 0
Ignition electrode A 24 50/70
Part Number: 8 716 108 097 0
7 Motor Sterling 133 & 146 FHP 125W
Part Number: 8 716 109 768 0
8 Oil pump - Danfoss BFP11 L3 32/50
Part Number: 8 716 142 736 0
8a Oil pump - Danfoss BFP52E L3 50/70
Part Number: 8 716 109 767 0
9 Transformer (Excludes cable)
Part Number: 8 716 156 696 0
10 Mechanical shut-off valve
Part Number: 8 716 156 658 0
11 Flexible oil hose kit
Part Number: 8 716 106 346 0
12 Burner 'O' shaped gasket
Part Number: 8 716 140 797 0
13 Heating control thermostat
Part Number: 8 716 107 621 0
14 Auto reset High Limit thermostat
Part Number: 8 716 107 798 0
15 Manual reset High Limit thermostat
Part Number: 8 716 107 621 0
16 Manual reset flue thermostat
Part Number: 8 716 107 624 0
17 Cleaning brush
Part Number: 8 716 109 428 0
18 Gasket manifold 32/50
Part Number: 8 718 680 315 0
Gasket manifold 50/70
Part Number: 8 718 680 344 0
19 Secondary Heat Exchanger gasket 32/50
Part Number: 7 747 009 829 0
Secondary Heat Exchanger gasket 50/70
Part Number: 8 718 680 093 0
20 Oil nozzle 32/50
0.85 60° ES (32kW output)
Part Number: 8 716 110 083 0

1.10 45° S (41kW output)
Part Number: 8 716 108 096 0

1.25 45° S (50kW output)
Part Number: 8 716 110 036 0

Oil nozzle 50/70
1.25 45° S (50kW output)
Part Number: 8 716 110 036 0

1.50 45° S (60kW output)
Part Number: 8 716 108 098 0

2.00 45° S (70kW output)
Part Number: 8 716 110 047 0

UNDER NO CIRCUMSTANCES MUST AN APPLIANCE BE LEFT TO OPERATE WITH ANY CONTROL LINKED OUT OR OVERRIDDEN.

PROBLEM	CAUSE	REMEDY
LOCKOUT:		
Pulsation on start	CF - Flue draught incorrect	CF - Check flue draught
	Combustion settings incorrect	Set up as in installation instructions
	Faulty nozzle	Replace nozzle
Intermittent lockout	Bad electrical connection	Check control box/electrical connections
	Intermittent flame detection fault	See flame detection fault
	Down draught	Extend flue or fit an anti-downdraught cowl (CF only)
Burner motor fails to operate	Faulty motor or electrical supply to motor	Check for 230V to motor during startup period
	Control box fault	Replace control box
Flame detection fault	Photocell filmed over (dirty)	Wipe clean
	Photocell faulty	Replace
	Control box faulty	Replace
Incorrect CO_2	Air adjustment fault	Set up as in installation instructions
	Oil pressure incorrect	Set up as in installation instructions
No oil from nozzle	No oil at pump	Check and refill oil tank/bleed oil line
		Check and clean filters & valves from oil tank to boiler
	Air in pump	Bleed pump
	Nozzle blocked	Replace nozzle
	Faulty pump or drive	Replace
	Faulty mechanical shut off valve (Bentone burner only)	Clean or replace
Ignition failure	Electrode settings incorrect	Set up as in installation instructions
	Faulty ignition transformer	Replace
	Open circuit ignition	Check and replace electrodes or high tension leads if necessary
	Faulty control box or electrical connections not properly made	Correct electrical control box connections or replace control box
BURNER FAILS TO START:	No power to boiler	Check electrical / control circuit
	Faulty boiler thermostat	Check by temporarily linking out high limit and control thermostats
	Programmer open circuit	Check programmer
	Faulty control box	Replace
HIGH SMOKE NUMBER:	Air intake/flue blocked	Check & clear air intake/flue
	Incorrect combustion settings	Set up as in installation instructions
	Oil pressure incorrect	Adjust to correct pressure
	Incorrect components used on combustion head	Check with installation instructions
	Faulty nozzle	Replace nozzle

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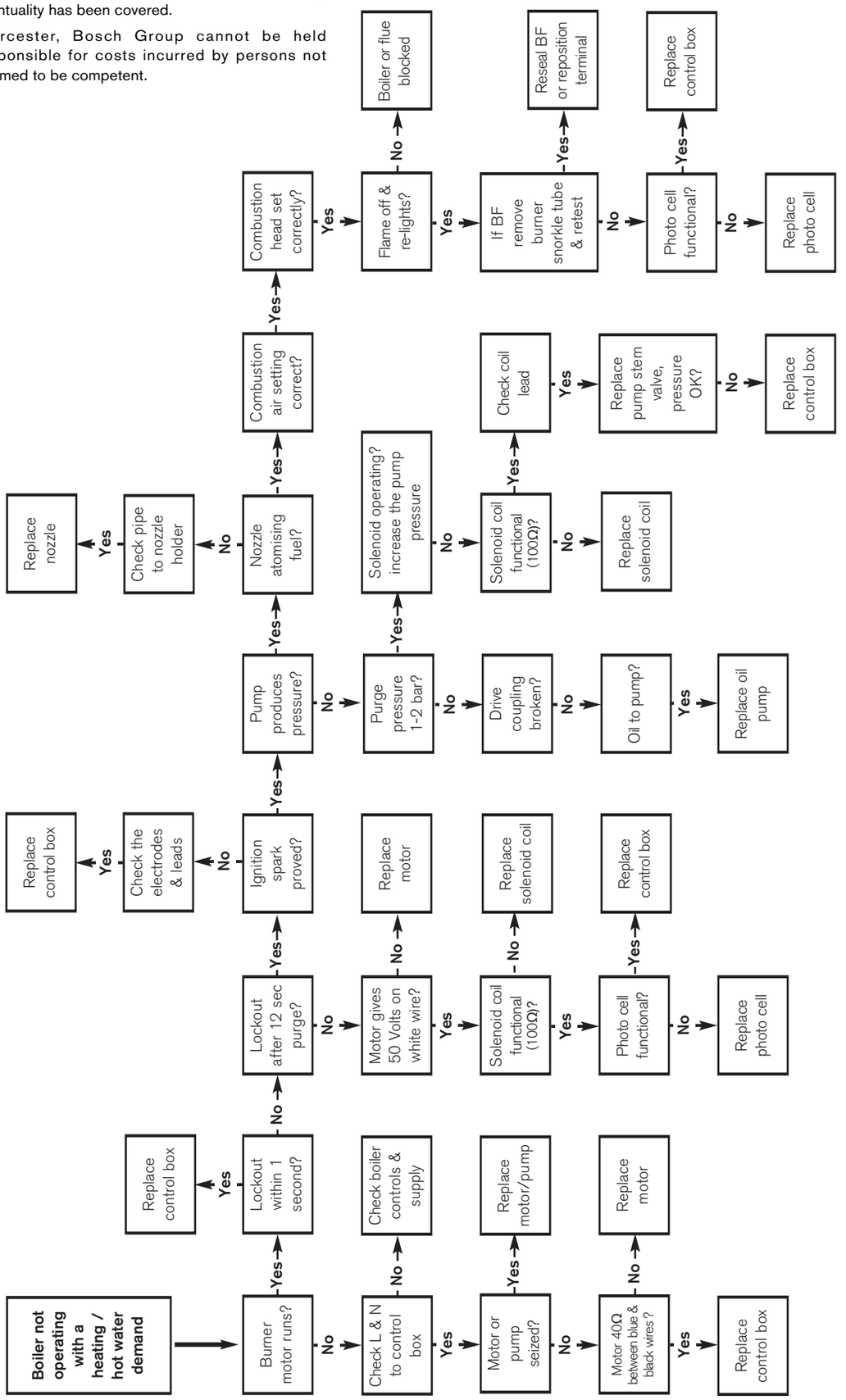
PROBLEM	CAUSE	REMEDY
FAULTY BOILER OPERATION:		
Noisy operation	Pump noise from air in pump or worn pump	Bleed air from pump or replace pump
	Worn motor bearings	Replace motor
	Fan out of balance	Replace fan
Boiling	Faulty boiler thermostat	Replace if necessary
	Short circuit boiler thermostat	Temporarily take out of circuit to check
	Thermostat bulb not fully home in pocket	Ensure bulb is pushed fully home
	No primary water circulation	Check system / circulating pump
Short Cycling	Burner rating incorrect	Correct burner rating
	Boiler thermostat differential incorrect	Replace boiler thermostat
	External controls not operating correctly	Check and correct external controls
OIL SMELLS:	Blocked flue, fumes on startup	CF - Check flue with gauge and check seals/gaskets
		RS - Check seals/gaskets
	Oil soaked boiler, faulty burner operation, numerous lockouts	Rectify burner operation and lockouts
	Odour in boiler room, oil leaks from pipework, flexible hoses connections	Rectify oil leaks, replace components if necessary

These fault finding charts are provided to assist competent and suitably qualified engineers to locate and rectify faults. Whilst every effort has been taken to ensure the information given is correct and complete we cannot guarantee that every eventuality has been covered.

Worcester, Bosch Group cannot be held responsible for costs incurred by persons not deemed to be competent.

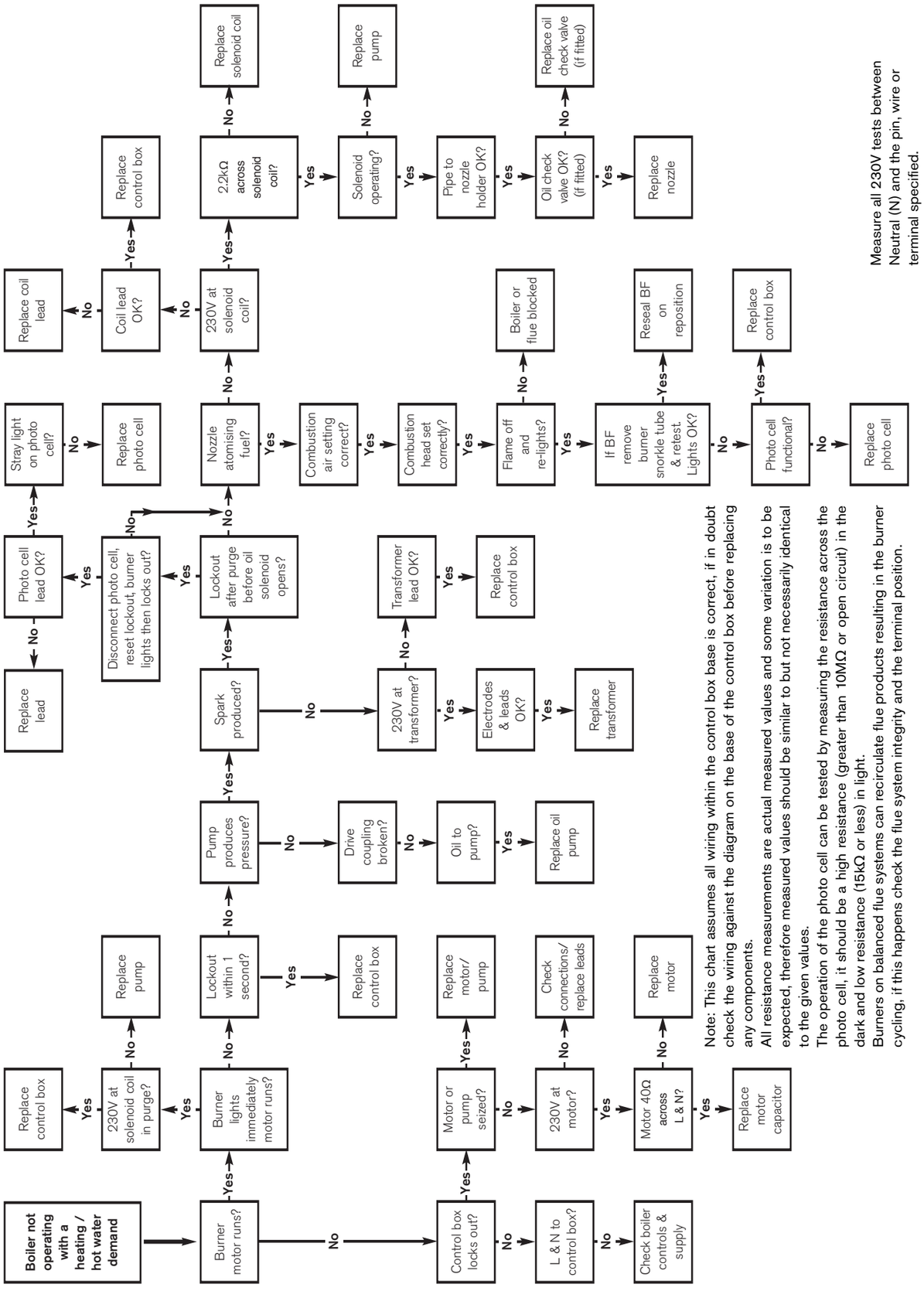
FAULT FINDING LOGIC FOR 535 SE/LD RDB CONTROL BOX



All resistance measurements are actual measured values and some variation is to be expected, therefore measured values should be similar to but not necessarily identical to the given values.
The operation of the photo cell can be tested by measuring the resistance across the photo cell, it should be a high resistance (greater than 10MΩ or open circuit) in the dark and low resistance (3kΩ or less) in light.
Burners on balanced flue systems can recirculate flue products resulting in the burner cycling, if this happens check the flue system integrity and the terminal position.

These fault finding charts are provided to assist competent and suitably qualified engineers to locate and rectify faults. Whilst every effort has been taken to ensure the information given is correct and complete we cannot guarantee that every eventuality has been covered.
Worcester, Bosch Group cannot be held responsible for costs incurred by persons not deemed to be competent.

FAULT FINDING LOGIC FOR SATRONIC CONTROL BOX



Measure all 230V tests between Neutral (N) and the pin, wire or terminal specified.

Note: This chart assumes all wiring within the control box base is correct, if in doubt check the wiring against the diagram on the base of the control box before replacing any components.
All resistance measurements are actual measured values and some variation is to be expected, therefore measured values should be similar to but not necessarily identical to the given values.
The operation of the photo cell can be tested by measuring the resistance across the photo cell, it should be a high resistance (greater than 10MΩ or open circuit) in the dark and low resistance (15kΩ or less) in light.
Burners on balanced flue systems can recirculate flue products resulting in the burner cycling, if this happens check the flue system integrity and the terminal position.

GREENSTAR UTILITY BOILER COMMISSIONING CHECKLIST

BOILER MODEL _____ ***SERIAL No.*** _____

COMMISSIONING ENGINEER	***COMMISSIONING CHECKS***
COMPANY NAME:	PUMP PRESSURE (PSI):
ADDRESS:	CO_2 %:
	SMOKE READING:
ENGINEERS NAME:	F.G.T.°C:
SIGNATURE:	FLUE PRESSURE:
DATE:	BURNER MODEL:

CONTROLS ***To comply with the Building Regulations, each section must have a tick in one or other of the boxes***

TIME & TEMPERATURE CONTROL TO HEATING	ROOM T/STAT & PROGRAMMER/TIMER	☐	PROGRAMMABLE ROOMSTAT	☐
TIME CONTROL TO HOT WATER	PROGRAMMER/TIMER	☐		
HEATING ZONE VALVES	FITTED	☐	NOT REQUIRED	☐
THERMOSTATIC RADIATOR VALVES	FITTED	☐		
AUTOMATIC BYPASS TO SYSTEM	FITTED	☐	NOT REQUIRED	☐

CONFIRM THE FOLLOWING:

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH THE INSTRUCTIONS	YES	☐
OIL TYPE USED IS KEROSENE	YES	☐
THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE INSTRUCTIONS?	YES	☐
THE SYSTEM CLEANER USED:		
THE INHIBITOR USED:		
HAS A WATER SCALE REDUCER BEEN FITTED?	YES ☐	NO ☐
WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED?		

FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD:

WATER FLOW RATE	☐	lts/min

CONFIRM THE FOLLOWING:

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS	NO ☐	YES ☐	
THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS	NO ☐	YES ☐	
HAVE YOU RECORDED A CO/CO2 RATIO READING?	N/A ☐	YES ☐	CO/CO_2 RATIO
THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER	NO ☐	YES ☐	

IMPORTANT: LEAVE THIS MANUAL WITH THE HOMEOWNER

SERVICE INTERVAL RECORD

It is recommended that the heating system is serviced regularly and that you complete the appropriate Service Interval Record Overleaf.

Service Provider.
Before completing the appropriate Service Interval Record overleaf, please ensure you have carried out the service as described in this manual. Always use Worcester, Bosch Group specified spare parts.

SERVICE 1 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 2 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 3 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 4 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 5 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 6 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 7 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 8 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 9 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 10 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi | CO_2%:

NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C | FLUE PRESSURE:

COMMENTS

SIGNATURE

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WEBSITE:	**www.worcester-bosch.co.uk**

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Worcester, Bosch Group is a brand name of Bosch Thermotechnology Ltd.

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